A Dissertation on

ANALYTICAL STUDY ON INTRAOCULAR FOREIGN BODY VISUAL OUTCOME ACCORDING TO OCULAR TRAUMA SCORING

Submitted to

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CERTIFICATE

This is to certify that **Dr.Seena A. C.,** Post Graduate student in M.S Ophthalmology, at Regional Institute of Ophthalmology and Government Ophthalmic hospital attached to Madras Medical College, Chennai, carried out this dissertation on **"ANALYTICAL STUDY ON INTRAOCULAR FOREIGNBODY VISUAL OUTCOME ACCORDING TO OCULAR TRAUMA SCORING"** under my direct guidance and supervision during the period from May 2006 to March 2009.

This dissertation is submitted to the TamilNadu Dr.MGR Medical University, Chennai in partial fulfillment of award of M.S. Degree in Ophthalmology.

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DECLARATION

I, **Dr. Seena A.C,** solemnly declare that the dissertation titled **"ANALYTICAL STUDY ON INTRAOCULAR FOREIGNBODY VISUAL OUTCOME ACCORDING TO OCULAR TRAUMA SCORING"** has been prepared by me. This is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfillment of the requirement for the award of M.S. Ophthalmology, degree Examination to be held in March 2009.

Place: Chennai

Date:

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PART 1

INTRODUCTION

Ocular trauma is one of the major cause of world wide vision impairment. Annual incidence of ocular trauma exceed 2million cases with more than 40000 people sustaining permanent vision impairment to a significant level. The place of injury could be anywhere from working place to recreational /agricultural /rural settings.

Mainly the people affected are younger individuals ;the male to female ratio being around 9:1. Financial penalty to person and family is another aspect of IOFB. Because of recent micro surgical technique and instrumentation prognosis of IOFB has improved for the past decades. Use of safety glasses in work places and education are the 2 factors which can reduce the incidence and ophthalmologists can play a key role in educating the population.

LITERATURE REVIEW

Penetrating injuries with retained IOFB are mainly seen in the young working population with greatest frequency in metal welding population and those who work in quarrys the incidence is roughly around 35 to 45% .in agricultural field the incidence being around 5-8%

Incidence of IOFB in penetrating injuries is 13-50%, the average being 31.8% . Among these majority are metallic or magnetic and engineering industry is the major cause of IOFB, roughly around ¾ th of the cases. Here in the conducted study , LE is more commonly involved than RE. The commonest site of lodgement is in posterior segment(56%) anterior chamber(9%), 19% in lens 7% in orbit by double perforation

Apart from these RTA and blast injuries during the festival season are the major contributors of IOFB. In 75% of cases wound of entry is in cornea 11% in sclera, 14% limbal. Final vision outcome invariably depend on the vision at time of presentation.

FACTORS AFFECTING FINAL VISION OUTCOME

1) mode of injury→ hammer &chisel injury causes maximum chance of intra ocular infection than with machinery.

2) wound of entry→ corneal wound has better prognosis than scleral wound because of protection offered by lens.

3) site of lodgement→ anterior segment>>good vision prognosis
posterior segment>>poor vision outcome

4) type of foreign body→ nonmagnetic and impacted magnetic foreign body gives poor vision outcome due to difficulty in extraction.

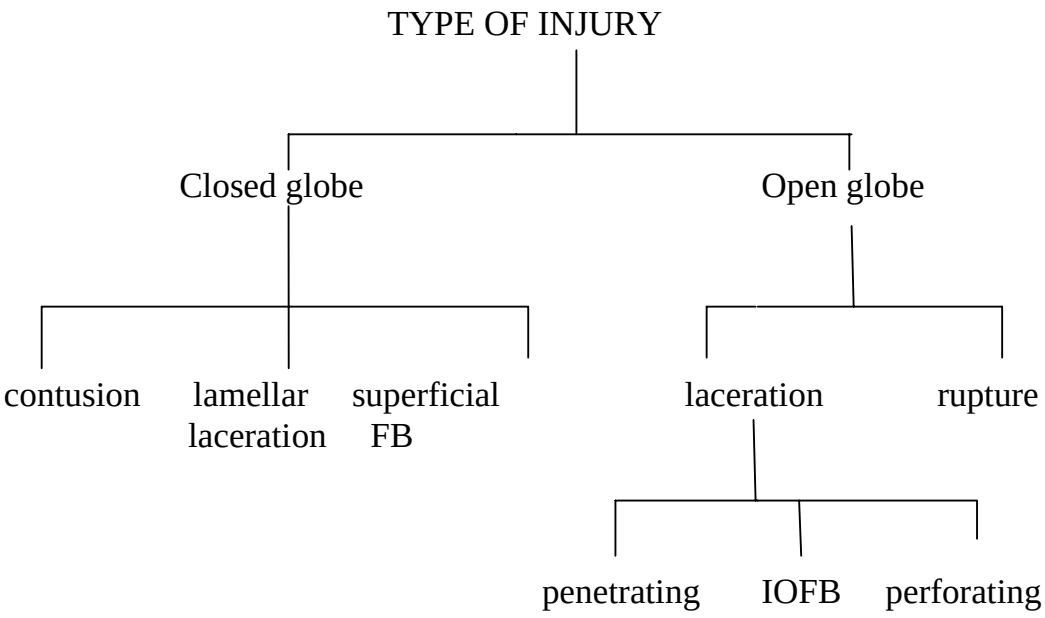
5) age →better prognosis is seen with 16 to 25 years

DEFINTTION

1) Penetrating injury→ simple laceration of eyeball caused by sharp object. No exit wound.

2) Perforating injury→ two full thickness laceration are present, one being entrance, the other being exit wound and caused by same agent.

CLASSIFICATION OF OCULAR TRAUMA BY WORLD TRAUMA GROUP



GRADE OF INJURY

Grade 1	>20/40 OR 6/12
Grade 2	>20/50 to 20/100 OR6/18 to 6/36
Grade 3	>20/100 to 20/200 OR 6/60 TO1/60
Grade 4	> 4/200 to PL OR 1/60 TO PL
Grade 5	NO PL

ZONE OF INJURY

Open globe	**Closed globe**
Zone 1→isolated corneal injury Involving limbus	Zone 1→external injury of conjunctiva/sclera
Zone 2→limbus to sclera 5mm behind	Zone 2→anterior segment Including Pc of lens & pars plana
Zone 3→posterior to anterior 5mm of sclera	Zone 3→posterior segment post. to pc

OCULAR TRAUMA SCORE

For the prediction of final vision outcome world trauma group has made an ocular trauma score system which consider initial vision at first examination, +/- rupture, +/- endophthalmitis, +/- perforating injury , +/- RD, +/- RAPD.

SCORE	OTS	FINAL VISION OUTCOME
1 to 44	1	NO PL to PL +
45 to 60	2	PL + to 1/60
60 to 80	3	5/60 to 6/18
81 to 89	4	6/18 to 6/12
90 to 100	5	>6/12

SCORE

VISION

No PL	→ +60	RUPTURE	→ -23
PL TO HM	→ +70	ENDOPHTHALMITIS	→ -17
1/60 TO 5/60	→ +80	PERFORATION	→ -14
6/60 TO 6/18	→ +90	RD	→ - 11
>6/12	→ +100	RAPD	→ -10

CLASSIFICATION OF IOFB

Inert substances : Stone, rock , clay, coal, carbon, glass, quartz, gold , silver, platinum.

Irritative metals : Iron , copper, lead, aluminium, zinc, nickel, mercury.

Organic material : Vegetable matter, cotton fiber, wool, animal matter, cilia, bone etc.

Surgically induced : Cilia, ointment, glass , rubber, silk, suture, talk powder, cotton fiber etc.

Clinical effects of IOFB

It is determined by momentum with which it travels. High speed foreign body severe damage and usually generate sufficient heat and get sterilized , so that chances of infections are less, when compared to metallic IOFB. Those which travel with less velocity cause less structural damage but severe infection eg → wood. Energy of traveling FB = ½ mv2 .

Size of FB → If less than 0.25 mm in diameter, structural damage is less.

Types of FB

Number of FB→ multiple FB occur with explosive wounds , dust , clay, glass & other debris .Magnetic property of FB aid in easy removal.

Site→FB like cilia do not travel far, usually seen in anterior segment. High speed metallic FB usually lodge in posterior segment.

CLINICAL MANIFESTATIONS

1) Mechanical effects
2) Particular tissue involved
3) Mechanical irritation
4) Nature &composition of FB
5) Infection

MECHANICAL EFFECTS

Wound of entry→ corneal wound unless large it heals rapidly. But scar is permanent. Conjunctival /scleral wound could be invisible. Iris hole, cataractous lens, vitreous degeneration, hemorrhage, retinal tear and detachment can be seen.

Migration of FB from interior to angle can occur due to compression of globe by Extra ocular muscle / pull of ciliary muscle on choroid during accommodation / influence of intra ocular fluid / spontaneous extrusion

TISSUE INVOLVED

Conjunctival perforation should be explored carefully since chance of penerating wound in the sclera. Except for chemosis or SCH there can be no other signs for an IOFB.

Cornea is more commonly get injured than sclera; because of exposed position. The wound can be linear laceration / stellate wound / puncture wounds. With central wound chance of traumatic cataract is more ; peripheral / limbal wound iris prolapse is more.

Scleral injury usually 2 types uncomplicated; and complicated ie; gaping uveal or retinal incarceration

Wound healing and scarring takes 3-4 weeks and all ocular coats are fused together. At the pars plana region it cause vitreous prolapse with little or no hemorrhage. Larger wounds tend to extend posteriorly .

AC can be quiet / iridocyclitis / hyphema

Iris → iritis / iridocyclitis / dialysis or hole / anterior or posterior synechiae formation.

IOFB involving the posterior segment can cause iridoplegia ; that is both sphincter & dilator become immobile & mid dilated pupil can be seen 3-6 weeks after the IOFB

Ciliary body shows the maximum reaction

lens shows localized opacity or traumatic cataract which could be quiet / intumescent / degenerative changes or spontaneous absorption

posterior segment → pathway to posterior segment could be cornea>>pupil>> lens

cornea >> iris>> lens

cornea >> iris >> zonules

Hemorrhage, infection, vitreous hemorrhage, retinal tear, detachment can be seen. Tissue reaction at local site lead to encapsulation, later leading to pigmentary degeneration of retina, fibrous band and tractional RD.

Field defects can occur as scotoma in the corresponding area if FB lies on horizontal raphe. Above &below it cause extensive nerve fibre loss.

Optic nerve hemorrhage or avulsion can occur

MECHANICAL IRRITATION

Depends on size, shape , sharpness of FB

Type of FB

organic→proliferative changes + granuloma formation +giant cells

non organic → remain free or encapsulated

metallic→ decompose

Specific effects

Inert substance cause variable response in AC or may be quiet. In posterior segment it may cause degenerative or proliferative changes in vitreous and retina

Irritative substances

Iron is the most common IOFB met with . Retention of which causes siderosis bulbi. Clinical picture depend on site & mechanical composition. Worst effect is seen when iron is on ciliary body / retina with out encapsulation. Better when located in lens or AC. In chemical composition , more the ferrous content; more the damage& chance of siderosis bulbi. Lesser the iron content; greater difficulty for extraction due to diminution of magnetisibility.

MECHANISM OF DAMAGE

Cytoplasmic deposition & accumulation lead to alteration of cell membrane permeability; breakdown of lysosome , liberation of enzyme, &cellular degeneration

Deposition in the form of ferritin / siderosomes.

In retina→ mullers & RPE degeneration

Interact with hyaluronic acid in vitreous & acid mucopolysaccharide in perivascular tissue.

PATHOLOGY

Tissue irritation followed by destruction occur generally. Densest deposition occurs in iris anterior surface& musculature, trabeculum, capsular epithelium of lens, ciliary body, & peripheral retina.

Direct siderosis : Occurs when iron get deposited in the neighbourhood of FB lodgement on lens within 3 weeks, as ring shaped brown yellow spots under anterior capsule,on retina, pigmentary degeneration if encapsulated, early diffuse siderosis if on optic disc.

INDIRECT OR DIFFUSE SIDEROSIS

Cornea : rusty staining occurs in periphery than in center

Iris : yellow brown rusting can occur. Heterochromia can strikingly occur. Synechiae formation , sphinctor dilator muscle damage, dilated pupil; resistant to atropine etc are other effects.

Lens : subcapsular brown dots later develop to large brown patches which is seen against the cataractous background. Later siderotic cataract will shrink, phacodonesis develop due to degenerative changes in zonules, leading to spontaneous subluxation.

Vitreous : degenerative changes occurs

Retina : changes become evident from months to 1-2 years as pigmentary degeneration developing peripherally; spreading posteriorly; with concentric visual field loss. Sclerosis of arteries , loss of foveal reflex are other changes

Optic disc : shows yellow rusty colour

Glaucoma: secondary open angle glaucoma can occur due to iron deposition in the angle. Clinically there will be concentric contraction of visual field blue >> red; night blindness ; complete amaurosis ; persistant irritation of eye ; mydriasis within 3-5 weeks.

OUTCOME

It is related to the amount of iron gaining access to intra cellular space; the toxic changes are irreversible after certain stage.

COPPER

Pure form→ causes suppurative reaction & catastrophic events

Alloy form→ as in bronze & brass if % of copper is <85% it will disseminate through out body and produce chalcosis.

Mechanism of damage is by preferential slow diffusion through limiting membrane.

Cornea→ deposited in descemets membrane forming kayser-fleischer ring.

Lens → pathognomonic sunflower cataract with golden brown radiant rays due to movement of iris . Vision is not impaired significantly.

AC→ brightly refractile copper particles can be seen.

Iris→ greenish colour with mydriasis and sluggish response.

Retina→ shining particles seen along retinal vessels / macula

Outcome

Many of the changes in chalcosis are reversible after the removal of FB

LEAD

Most inert & get encapsulated in a layer of insoluble carbonate & form pellets.

NICKEL

Produce purulent inflammation.

MERCURY

Usually contamination occur in neon light explosion. Causes purulent inflammation in AC & Posterior segment.

ORGANISED MATERIALS

Commonest is wood. Exudative reaction with encapsulation; infection by yeast / other fungi or pyogenic organism result in abscess formation or panophthalmitis.

COMPLICATIONS

i) Penetrating injury

Corneal Wound

Irregular astigmatism, epithelial ingrowth, adherent leucoma by iris incarceration, choroid /retina / ciliary body detachment , keratectasia , staphyloma, cystoid cicatrix /corneal fistula

traumatic cyst : usually rare ; it could be implantation or degenerative cyst.

cyclitic membrane : rupture of lens / laceration of ciliary body / vitreous hemorrhage lead to ciliary body detachment ; hypotony ; RD ; atrophy of globe ; by development of anterior vitreous fibrosis with cyclitic membrane formation.

ii) IOFB complication

- intra ocular hemorrhage.
- endophthalmitis mainly by bacillus cereus; staph epidermidis.
- sympathetic ophthalmitis : Rare. Seen with uveal tissue incarceration especially in ciliary zone. Can occur in 2 weeks to 3 months or later. Exciting eye shows few signs ; sympathizing eye shows plastic iridocyclitis.
- specific effects : siderosis & chalcosis.

- tractional RD ; secondary glaucoma by angle infiltration, peripheral anterior synechiae formation, intra ocular hemorrhage , lens induced glaucoma, or pupillary block.

- phthisis bulbi : late complication.

MANAGEMENT OF PENETRATING INJURY

a) Assessment of injury

a) History

1) nature of injury

2) details of other injuries

3) first aid treatment

4) previous eye disease

5) general medical history

b) examination

visual acuity recording, external examination of eye, anterior segment examination /slit lamp examination /gonioscopy, posterior segment examination by direct /indirect ophthalmoscope , IOP measurement should not be done in open wound / perforation , clues to a

silent foreign body , slit lamp examination showing a tract in cornea / iris / lens , angle trauma with peripheral anterior synechiae/ angle recession , iridotomy/ iridodialysis / heterochromia , anisocoria / irregular pupil , sector zonulolysis persistant uveitis / hypopyon.

Investigations for IOFB

>methods utilizing **magnetizability.**

>methods depending **electrical conductivity** and induction **Berman's locator** : detects the range of iron and steel 10 times the diameter of foreign body. That is a particle of 1 mm is detectable at 10 mm. For copper & brass the range is only 1-2 times ;so a large size is needed.

>**radiographic methods** : should use new cassette & can be repeated if presence of FB is doubtful methods depends on

>direct method of localization

>rotational movements of eye

>geometrical projection

>stereoscopic methods by taking several x –rays in different positions.

>delineating the globe by contrast ;by using radio opaque contrast into tenons space to differentiate intraocular / extra ocular position.

>bone free methods of localization : dental film held by the patient is held against the medial canthus . x-ray of low voltage are used to picture anterior portion of globe. Tiny metallic FB , glass ,plastic within cornea , anterior chamber or overlying ciliary body are well localized. Helps in localization of aluminium foreign body which have similar density to bone.

>**Ultrasonography**

Compared to ocular tissue foreign body will reflect sound more. Intensity of echo depend on size , shape , and angulation of foreign body in relation to examining beam. Maximum intensity seen when object is perpendicular to sound beam. A string of artifactual reduplication echoes is seen behind the initial strong reflection . ocular wall & orbital fat shows acoustic shadowing. Both A & B scan can detect FB.

Advantage of USG

- non-radio opaque FB can be localized
- accurate measurement of axial length aids in correct localization.
- Allows to assess other effects of FB like vitreous hemorrhage, RD
- Along with electromagnet it can be used to see magnetizability of FB.
- Nonmagnetic FB can be removed with forceps under USG guidance.

COMPUTERISED TOMOGRAPHY

Localization of ocular / orbital FB which are visible / not visible by other radiographic methods. Axial and coronal 2mm cuts are taken to find out the exact position of FB ; cortical vitreous /sclera / orbit. Occult rupture with posterior flattening (FLAT TYRE) sign can be seen in CT.

NUCLEAR MAGNETIC RESONANCE IMAGING

Safe & no exposure to radiation. Contraindicated in case of magnetic FB.

ELECTROPHYSIOLOGICAL TESTS

ERG is particularly useful in cases where a potentially toxic FB is left behind. Earliest ERG response in siderosis bulbi is loss of oscillatory potential ; followed by progressive reduction of b wave amplitude until it is extinguished.

MANAGEMENT OF PENETRATING INJURY

With the advent of microsurgery, prognosis has improved considerably. Clinical management depend on :Accurate management of FB ; knowledge of composition ,size, shape ; Appropriate decision on remove or leave & Technical competence.

MEDICAL MANAGEMENT

Injection tetanus toxoid as per immunization status ,Local / systemic antibiotics , Atropinisation , NSAID to minimize inflammation , Analgesics & sedative to relieve pain. In suspected endophthalmitis intravitreal vancomycin 1000mcg amikacin 400 mcg is given.

SURGICAL MANAGEMENT

Principles

1) closure of all wounds in eye

2) prevent infection

3) clear the ocular media

4) remove all vitreous surrounding FB

5) removal of FB in least traumatic way

6) treat associated RD/ retinal break

ANTERIOR SEGMENT RECONSTRUCTION

1) Management of corneal wound

bandage contact lens : small injury with adjacent healthy tissue it can be used. With in 3-6 weeks if there no healing, surgical intervention is advised.

cyanoacrylate tissue adhesive : used for small lacerations <2mm. Surrounding epithelium is cleared & tissue adhesive is spread & dried. Soft contact lens is placed over it with topical antibiotics after drying. With in 8-12 weeks epithelialisation will occur & glue will get dislodged.

corneal suture : used in cases of large lacerations >2-3 mm. Interrupted 10-0 sutures are used. Extreme sutures are wider and deeper compared to central suture. For a stellate wound purse string suture is used . Usually suture removal is done at 8 weeks. Early removal in cases of vascularisation & late removal in delayed wound healing.

patching : advocated in cases of pinpoint perforation for a period of 24 hours. In case of corneal injury with tissue loss patch graft is advised. It should be 0.5 mm larger than the recepient bed.

Management of iris prolapse

Abscission is advocated if iris prolapse is more than 24 hrs or any sign of infection or severely lacerated iris. If healthy iris tissue should be reposited by injecting viscoelastic / air / iris repositor.

Management of posterior segment injuries

Scleral injuries are sutured with 8-0 or 7-0 sutures used from anterior to posterior with uveal tissue reposition if needed. If extending beneath the extra ocular muscle ; it should be disinserted; sclera should be sutured and then muscle is sutured. Vitreous prolapse should be cut with

sharp scissors uveal & retinal incarceration should be avoided in sutures. Retinal tears are treated with cryotherapy and RD with scleral buckling.

MANAGEMENT OF IOFB

Danger of leaving a FB should be compared with danger of removing it. Nonmagnetic FB or those which are encapsulated / not visible are better left inside. Removal can be done at the time of repair or soon after . late removal is associated with siderosis ;chalcosis / endophthalmitis.

Magnetic IOFB

Types of magnets are giant magnet ;permanent hand magnet electromagnet; bronsion- magnion instrument rare earth intraocular magnet.

Attractive power of magnet varies inversely with the cube of the distance between it and foreignbody.

Bluntest magnet is consistant with surgical repair.

Intermittent power is better and all metallic instruments should be kept away from the field.

ANTERIOR SEGMENT IOFB

FB in angle of AC

Removed through a scleral flap as in trabeculectomy. But position of FB should be confirmed with a locator

FB in AC & iris

Through a limbal incision of adequate size it could be removed with forceps or magnet. Damage to the lens should be avoided by constricting the pupil before removal. If it is in the iris it should be removed by iridectomy.

FB in the posterior chamber

Exact position is identified by electronic locator and removed through a double trap door. Removal could be done with giant magnet . Vitreous prolapse if present should be cut and wound is closed.

FB in lens

If the lens is clear with good visual function and nonreactive FB surgery can be delayed. If cataract is formed ; cataract extraction should be performed with pciol implantation.

Foreign body in ciliary body

It can be removed via trans scleral approach with a hand magnet .

POSTERIOR SEGMENT FOREIGN BODY

Magnetic Foreign Bodies

Routes of approach are pars plana , trans scleral , limbal. Intra vitreal foreign body is visualized well, then it can be removed by pars plana approach. If it is free floating either a superotemporal or infero temporal approach is advised as it provides good exposure with minimal retinal trauma. If it is fixed, the quadrant of pars plana nearest the foreign body is used.

If the foreign body is poorly visualized either due to cataract or vitreous hemorrhage , it is better to perform pars plana lensectomy or vitrectomy. Removal can then be done either with a intraocular foreign body forceps through a pars plana sclerotomy with rare earth intraocular magnet or with external magnet.

Intra retinal foreign body

Extraction is usually done trans –sclerally over the foreign body, except in foreign bodies near macula, optic nerve or posterior ciliary vessels , where a pars plana approach is used.

When the media is clear and the foreign body can be well visualized well with an indirect opthalmoscope, removal is done by trans scleral approach. A trap scleral flap is created. This exposes the choroidal bed, which is treated with external diathermy before cutting. It is then incised and foreign body removed with either forceps or magnet. If retinal incarceration is present; scleral buckle is applied.

When foreign body is not visualized clearly, PPV is performed. Foreign body is mobilized with forceps by removing the adhesions using myringotomy blade. Two rows of endolaser applications are around the site of application. It is necessary to treat posterior vitreous detachments by gentle suction or vitreo retinal pick.

If the foreign body is too large (>7 mm) , it can be removed through an incision placed at limbus. The foreign body is brought in to AC through trans papillary route after lensectomy. Then it is removed either with forceps or magnet.

NONMAGNETIC FOREIGN BODY

Surgical manipulations are more disruptive than magnetic foreign body. Approach is through pars plana in vitreal foreign body and trans sclerally for intra retinal foreign bodies.

Failure to remove foreign body

- inappropriate selection of magnetic tip
- entanglement of foreign body in fibrous and inflammatory debris
- distant small or weakly magnetic foreign body

VITRECTOMY

It offers the advantage of clearing the media and operating under microscope with good visualization and full control over extraction process.

Indications

- opaque media – vitreous hemorrhage
- non-magnetic foreign body
- large foreign body
- sub retinal foreign body
- endophthalmitis

MANAGEMENT OF COMPLICATIONS

Anterior segment

astigmatism : regular astigmatism with out axial scarring can be corrected with a contact lens. Errors exceeding >6D are not tolerated. Surgical options include corneal grafting for scars , irregular astigmatism or relaxing incisions for upto 4D. Both procedure help to flatten a steep meridian. Compression suture will help to steepen flat meridian.

Corneal opacity : for superficial layer involvement lamellar keratoplasty and for total opacity penetrating keratoplasty is done . keratoprosthesis for vascularised and severely traumatized cornea. Superficial keratectomy for superficial opacities.

Cataract : traumatic cataract is treated with cataract extraction and IOL implantation and can be combined with PKP if needed. If posterior capsule is not intact AC lens can be implanted. Unilateral traumatic aphakia can be treated either with contact lens or with secondary IOL implantation preferably PCIOL or ACIOL if PC is not intact.

Iris defects : iridoplasty using 10-0 nylon or prolene can be done to reform tight iris diaphragm in order to prevent posterior synechiae formation and secondary glaucoma and to increase graft survival by

preventing glaucoma and iridocorneal adhesions. Pupil reconstruction to prevent glare and better cosmetic result. Formation of a stable iris diaphragm to allow placement of AC lens.

Management of secondary glaucoma : late onset glaucoma due to formation of PAS or epithelial in growth or stromal over growth. In initial stages the accessible epithelial tissue is excised after closing the fistula. In the late stage cryotherapy can be applied to inaccessible areas.

Cyclitic membrane : it can be incised with capsulotomy knife or segmented with scissors and removed with vitreous cutter through limbal approach.

Posterior segment

retinal complications : retinal incarceration is treated by vitrectomy with scleral buckle. Retinal break and tears can be treated by cryopexy if it is a peripheral lesion ; and endophotocoagulation can be tried for posterior lesions. Encircling band used in cases of peripheral breaks . radial scleral buckle placed in cases of posterior lesions.

For larger tears PPV with internal tamponade with a mixture of air and SF6. Fluid gas exchange preferred to silicone oil as it is long acting.

Retinal detachment can be treated with radial silicone sponges as the laceration run posteriorly. Cryotherapy is applied to vitreous base in quadrant affected by wound.

Tangential and antero posterior vitreal traction on retinal break is removed by membrane peeling or delamination or segmentation. Encirclement is done for more extensive lesions. Macular pucker is treated with vitreoretinal pick with intra retinal forceps.

Aim of management

Primary aim is to regain the vision. If not possible structural reconstruction should be aimed. If this also is not possible life saving measures has to be considered in cases of endophthalmitis or panophthalmitis. Enucleation is indicated in perforated eye with no PL or phthisical or an irritable eye despite treatment; or totally disorganized globe with no PL vision. Evisceration is considered in case of panophthalmitis or severe penetrating injury with tissue loss and expulsive hemorrhage / extrusion of intra ocular contents

PART II

AIM

1) To study the annual incidence of intraocular foreign body at a teritiary level institute

2) To compare the expected visual outcome as per OTS with the final vision outcome according to our management

3) To compare the complications of anterior segment vs posterior segment IOFB

4) To assess the efficacy of different modalities of treatment

MATERIALS AND METHODS

163cases of penetrating injuries presented to RIOGOH for past 2 years from 2006 june to 2008 june are included in this study. The intra ocular foreign body nature varied from magnetic/ non magnetic / vegetable etc.

A detailed history regarding nature of injury +/- presence of protective glasses nature of foreign body previous ocular disease etc are assessed.

Vision at presentation and final vision assessed by Snellens chart and tension recorded by non contact tonometry. Detailed examination done for site of entry of foreign body AC reaction lens damage vitreous hemorrhage IOFB site of lodgement and fundus examination done by IDO and 90 D . location of foreign body assessed with x-ray limbal ring and B – Scan.

MANAGEMENT

Injection TT ; injection antibiotics ; particularly ciprofloxacin, garamycin, cycloplegics; NSAID; topical antibiotics are given.

Foreign body extraction done in the following routes

1) anterior route

2) posterior route

ANTERIOR ROUTE

Intra ocular foreign body in the anterior segment upto posterior capsule is removed through limbal incision forceps. In traumatic cataract particularly PCIOL is implanted if posterior capsule is intact.

POSTERIOR ROUTE

Removed through PPV or using a giant magnet . Cryo is done in the surrounding area of intra ocular foreign body. In large entry wound , the wound repair done with 6-0 / 8-0 sutures.

FOLLOW UP

Weekly follow up × 1 month

Monthly follow up× 6 months

During follow up vision out come, tension, other complication, and assessment of reason for decreased vision accurately were noted. Treatment given accordingly.

ANALYSIS AND DISCUSSION

YEARLY INCIDENCE

2006 JULY-June 2007	60	Total IP 85072	%age 0.070
2007 July –2008 June	63	88330	0.071

For the past 2 years more or less the incidence is same. The mode of injury are similar in both the years.

MONTHLY INCIDENCE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006							4	5	6	8	9	5
2007	6	3	4	5	2	3	2	3	3	9	11	4
2008	8	4	5	6	5	4						

Maximum during the festival seasons which are contributed in number by cracker injuries

AGE INCIDENCE

S No.	Age	No. of cases	%age
1	0-10	9	7.31
2	11-20	14	11.38
3	21-30	34	27.64
4	31-40	21	17.07
5	41-50	25	20.32
6	>50	20	16.26

Maximum age incidence occurs in earning age group, in 3rd, 5th and 4th decade.

SEX INCIDENCE

S No.	Sex	No. of cases	%age
1	Male	95	77.23
2	Female	28	22.76

Males are more commonly involved since the working group is mainly contributed by them. 28% is contributed by females, mainly working in quarries.

EYE INVOLVED

S No..	Eye	No. of cases	%age
1	Right	51	41.46
2	Left	72	58.53

LE is mainly involved . the reason could be the right handed ness of majority of the people . Here the left eye and the working object comes in a straight line which is common in hammering.

WOUND LOCATION

Sno.	Site	No. of cases	%age
1	Cornea	92	74.79
2	Sclera	13	10.56
3	Corneosclera	18	14.63

In 74% of cases wound of entry is located in the cornea followed by 14% in corneosclera, & 10% in sclera.

TYPE OF FOREIGN BODY

Sno.	FB type	No. of cases	%age
1	Metal	69	56.09
2	Stone	24	17.88
3	Vegetable	18	14.63
4	Other(lash)	14	11.38

MECHANISM OF INJURY

Sno.	Type	No. of cases	%age
1	Hammering	69	56.09
2	Breaking stones	27	21.95
3	Cracker injury	7	5.69
4	Injury with wood	20	16.26

In our population the major mechanism of injury is hammering followed by breaking stones. Agricultural field IOFB contribute 16% & 7% is contributed by cracker injury.

56% are metallic, 18% stones 15% vegetables, 12% lash/ glass etc.

PRESENTATION

SNo.	Presentation	No. of cases	%age
1	iritis	72	58.53
2	vitritis	2	1.62
3	cataract	37	30.08
4	iris hole	1	0.8
5	Vitreous hg.	42	34.14
6	RD	5	4.06
7	Endolph.	16	13
8	Choroidal eff.	1	0.8
9	Panoph.	2	1.62
10	Phthisis	1	0.8

Majority presented with iritis which was treated and cured. 30% of cases presented with traumatic cataract are treated with cataract surgery & IOL implantation. 4% of cases had poor vision out come due to RD , 13% due to endophthalmitis,& 2% due to panophthalmitis. Out of 123 cases , 1 case had choroidal effusion, & 1 gone for phthisis.

SITE OF FOREIGN BODY LOCATION

S No.	Site	No. of Cases	%age
1	AC	11	8.94
2	Lens	24	19.51
3	Post. Seg	Vit.-64 Ret-4	52.03 3.25
4	Sclera/Corneal Stroma/orbit	20	16.26

In 55% of cases foreign body was found in posterior segment, mainly in the vitreous.other sites are lens (20%) , 9% in AC , the rest in cornea / sclera etc.

SITE LODGEMENT AND VISION OUTCOME

SNo.	Loc.	1/60- PL		6/60- 1/60		6/18- 6/36		>6/12	
		Ad.	D/D	Ad.	D/D	Ad.	D/D	Ad.	D/D
1	P/S	17	31	34	28	10	19	2	4
2	I/L	13	2	5	2	3	4	3	16
3	AC	-		-		3	2	8	9

Anterior segment and lenticular foreign body are having good vision outcome .in posterior segment foreign body if the initial vision at presentation is poor, final vision also found to be poor.

INITIAL VISION & FINAL VISION OUTCOME

SNo.	Vision	Initial vn	%age	Final v	%age
1	<6/60	85	69.10	52	42.27
2	6/60-6/18	22	17.88	29	23.57
3	>6/18	16	13	42	34.14

GRADE OF INJURY

SNo.	Grade	Vision	No. of Cases	%age
1	Gr I	6/12	18	15
2	Gr II	6/18-6/36	14	11.66
3	Gr. III	6/60-1/60	31	25.83
4	Gr. IV	1/60-PL	54	45
5	Gr. V	No PL	3	2.5

Though 69% cases presented with <6/60 vision , only 52% had poor vision on discharge. Rest 17% gained good vision by our management. Others with >6/60 vision gained good vision at the time of discharge.

In the studied cases 45% had sustained grade IV injury with 1/60 to PL vision. 26% had grade III injury with 6/60 to 1/60 vision. 12 % had grade II with vision 6/18 to 6/36. 155 had grade I injury& gained >6/12 vision. 2.5% with grade V injury discharged with no PL vision.

EXPECTED VISION AT PRESENTATION & FINAL VISION OUTCOME

SN	Score	OTS	Case	E Vn	F. Vn		%age	
					Att.	Not	Att.	Not.
1	1-44	1	19	NoPL-PL	19	-	100	-
2	45-60	2	29	PL-1/60	28	1	96.55	3.45
3	60-80	3	55	2/60-6/36	52	3	94.54	5.46
4	81-89	4	16	6/18-6/12	16	-	100	-
5	90-100	5	1	>6/12	1	-	100	-

19 cases who gained a score of 1-44 considered as OTS 1

29 with score of 45 –60 as OTS 2

55 with score 60 –80 as OTS 3

16 with score 81 to 89 as OTS 4

1 case with score 90- 100 as OTS 5

In OTS 1 ,4 & 5 , 100% attained the expected vision outcome.

In OTS 2 97 % attained the expected vision but 3% not.

In OTS 3 95% attained the expected vision 5% not .

MANAGEMENT

Anterior route : foreign bodies were removed through the limbal incision in majority of cases

Posterior route : giant magnet was used. Pars plana or trans scleral route is used.

In 9 patients foreign bodies were not removed.

Non magnetic foreign body in 56 patients.

Vitrectomy done in 39 patients.

Endophthalmitis occurred in 16 patients.

COMPLICATIONS

s no	complications	No	%age
1	RD	5	4.06
2	PANOPHTHALMITIS	2	1.6
3	ENDOPHTHALMITIS	16	13
4	VITREOUS HEMORRHAGE	42	34
5	PHTHISIS	1	.8

34% of cases had vitreous hemorrhage which remained the cause of poor vision. 13 % gone for endophthalmitis, 4% RD, 2% panophthalmitis , 0.8% phthisis

SUMMARY

1) 123 cases of retained IOFB studied in which 69 were metallic 22 stones 18 vegetables 14 glass/ eye lash etc.

2) yearly incidence remain more or less the same.

3) Maximum incidence occurs in festival season

4) majority of the cases are occurring at 3^{rd} ,4^{th} and 5^{th} decade , the working age group

5) majority of the cases occurred in males who are mainly involved in mechanical industry

6) LE more commonly involved than RE in right handed individual due to orientation of LE to the hammer.

7) In 74% of people the entry wound seen in the cornea , followed by corneoscleral in 18% and scleral in 13 %.

8) Hammering was the major mechanism of injury.

9) Majority presented with iritis.

10) In 55% of cases Foreign body location was in the vitreous.

11) Prognosis was proved to be good for anterior segment foreign body when compared to posterior segment due to less tissue injury and easy removal.

12) Out of 123 cases studied 45% were grade iv injury ,25% gr.iii injury, 15% gr 1 injury, 12% gr ii injury 3% gr v injury.

13) As per the guide lines by world trauma group, 100% of OTS 1,OTS 4 and OTS 5 patients attained the expected final vision by our management.

14) In OTS 2 97 % attained the expected final vision. In OTS 3 group 95% attained the expected vision.

CONCLUSION

1) OTS is an excellent tool to assess the final vision out come in patients with retained intra ocular foreign body.

2) The initial vision at presentation , +/- rupture , +/- endophthalmitis +/- RD , +/- RAPD, +/- perforating injury are counted and given score.

3) The expected vision depends on the OTS.

4) X-ray limbal ring and B-Scan provided exact localization of foreign body.

5) PPV, GM, were used to remove the posterior segment foreign body and in anterior segment, forceps were used for removal.

6) PPV proved to be an excellent method of IOFB removal with good vision out come.

7) According to this study it is proved that the final vision out come is comparable with world trauma group standards.

8) Since IOFB causes a major drop in vision we ophthalmologist should educate people to wear protective glasses.

PROFORMA

Serial No	IP No
DOA	DOD
Name	Age
SEX M/F	Occupation

HISTORY

Affected eye	RE/LE
Protective glasses worn	YES/ NO
Nature of injury	hammering / RTA/ breaking stone Agricultural
Nature of object	metal/stone/veg/others
Time interval b/w	immediate/late
Injury and admission	
Vision prior to injury	
Previous ocular injury	
Previous ocular disease	

EXAMINATION

Lids, adnexa	
Conjunctiva	normal/SCH/ congestion/ tear
Cornea	site of entry/ iris incarceration/ prolapse
Sclera	tear/ pigmentation/tissue incarceration
A.C	depth/ exudates/IOFB
Iris	nl/hole prolapse/IOFB
Pupil	normal/miotic/dilated/reaction to light
Lens	clear/cataract/ subluxation/dislocation/IOFB
Vitreous	clear/ vitritis / VH / IOFB
Retina	normal /retinal detachment/ retinal tear/ Retinal oedema/IOFB
Fundus	
Vision after injury	
Vision of fellow eye	
IOP	
X-ray-PA/ limbal ring	
Usg A scan/ B scan	

TREATMENT

Medical

Surgical

Complications

Condition on discharge

V/A

Fundus

IOP digitally

Other eye V/A

FOLLOW UP

Weekly for 1 month

Monthly for 6 months

INDEX TO MASTER CHART

S.no		
Name		
I.P no		
Age in years		
Sex	RE	Right eye
	LE	Left eye
Foreign body agent	M	Metal
	S	Stone
	Veg	Vegetable matter
Time of presentation	I	Immediate
	L	Late
Conjunctiva	C	Circum corneal congestion
	SCH	Sub conjunctival hemorrhage
Site of foreign body	S	Sclera
	C Str	Corneal Stroma
	V	Vitreous

	R	Retina
	L	lens
	I/O	Intra orbital
Anterior chamber	N	Normal
	S	Shallow
	FB	Foreign body
	H	Hyphema
	Ex	Exudate
Pupil	N	Normal
	Sl	Sluggish
	RAPD	Relative afferent papillary defect
Iris	N	Normal
	CPA	Colour pattern altered
	Ex.M	Exudative membrane
Lens	N	Normal
	Dis	Dislocated
	C	Cataractous

	FB	foreign body
Posterior segment	N	Normal
	VH	Vitreous hemorrhage
	Endoph	Endophthalmitis
	Panoph	Panophthalmitis
	R. tear	Retinal tear
V/A Ad	Visual acuity	at admission
V/A D/d	Visual acuity	at discharge
Oth. Eye	Other eye	visual acuity
FB rem.	Foreign body removal	
	PPV	Pars plana vitrectomy
	W.ex	Wound exploration
	Simcoe	
	Forceps	
	GM	Giant magnet
Oth. Pro	Other procedure	
	SFIOL	Scleral fixation IOL

SICS	Small incision cataract surgery
PPV	Pars plana vitrectomy
Evisce	Evisceration
Barrage	
Late comp	Late complication
Endoph	Endophthalmitis
Panoph	Panophthalmitis
Ch. Effn	Choroidal effusion
Phthisis	
RD	Retinal detachment
Mac. Op	Macular opacity
Inf. Sh . RD	Inferior shallow RD
OTS	Ocular Trauma Scoring
Max. Ex. Vn	Maximum expected vision

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7) Ocular trauma – shingleton

8) Ocular trauma – Gupta

JOURNALS

9) Retina Vol 23/5 Oct. 2003 p. 654-660 for posterior segment foreign body : visual results and prognosis factors

10) 5^{TH} International symposium on ocular trauma by World trauma working group

11) Current opinion in ophthalmology vitrectomy for posterior segment IOFB visual results

12) Bio- Med central -A five year retrospective study of the epidemiological characteristic and visual outcome of patient hospitalized for ocular trauma

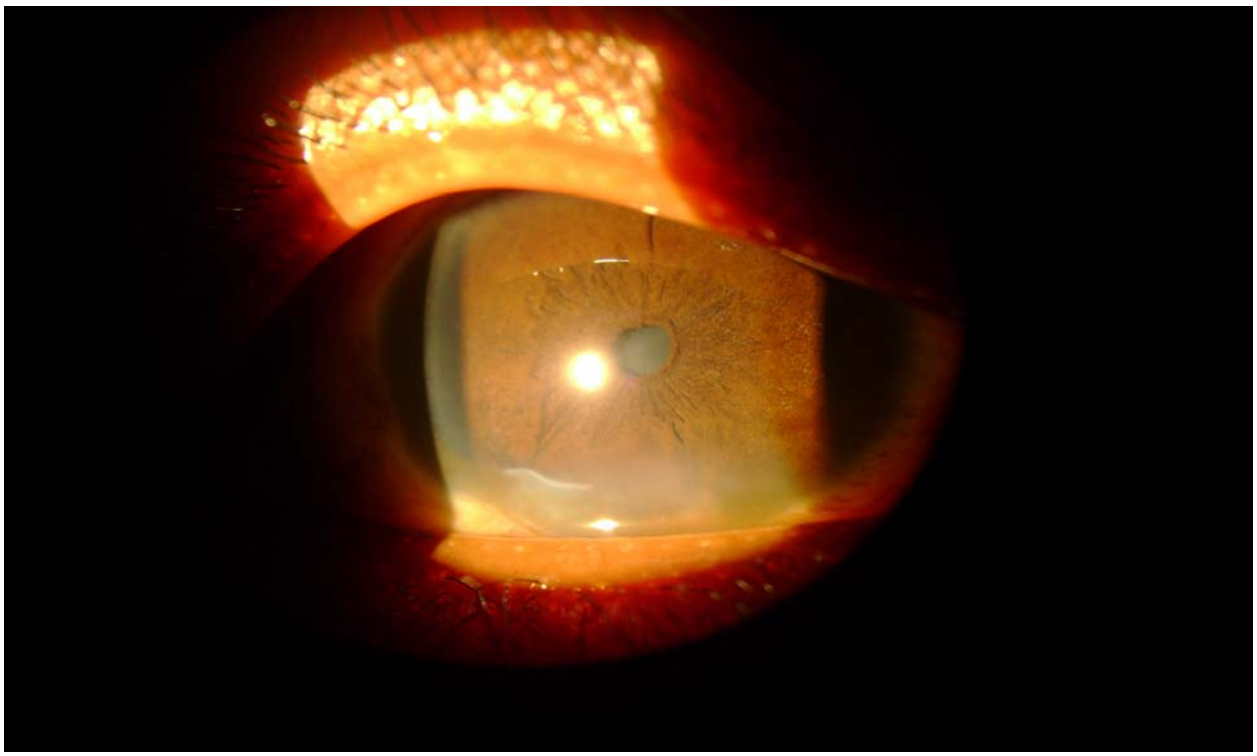
13) Indian journal of ophthalmology- magnetic IOFB in posterior segment by Dr Ithyerach TP

14) IJO 1984 sep – perforating ocular injuries with retained IOFB

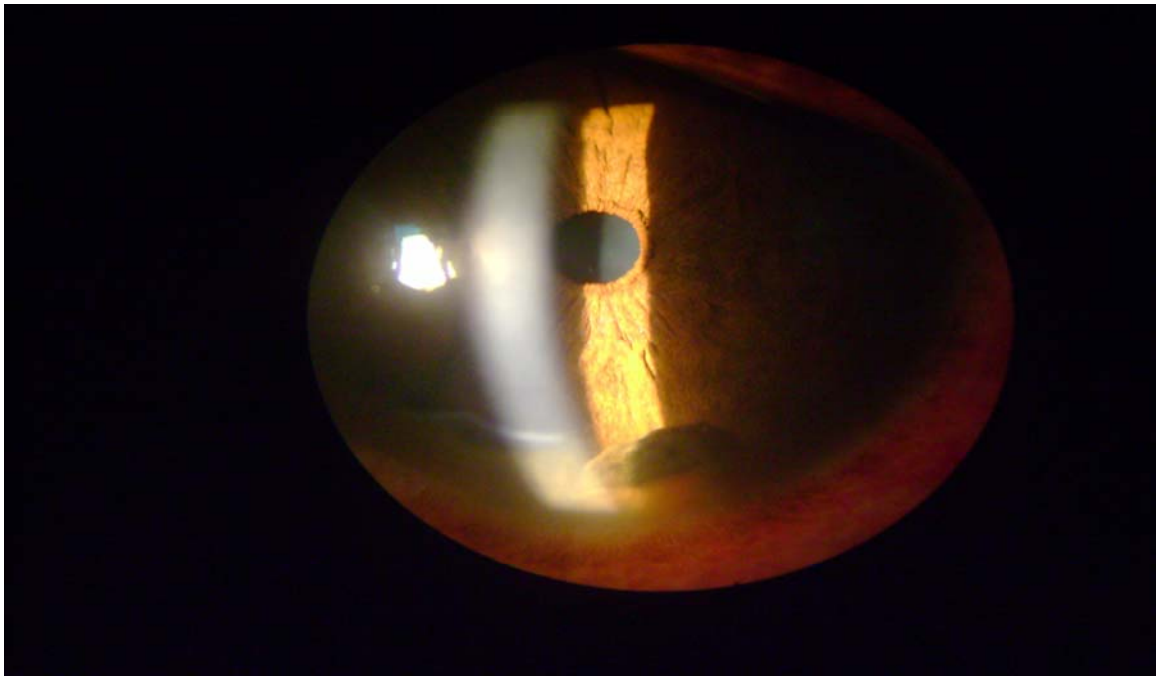
15) AIOS proceedings of 46th annual conference 1988 pars plana approach in removal of IOFB

16) AIOS proceedings of 58th annual conference ,2000 – management of IOFB

17) Highlights of ophthalmology 1995 vol 23 management of ocular trauma

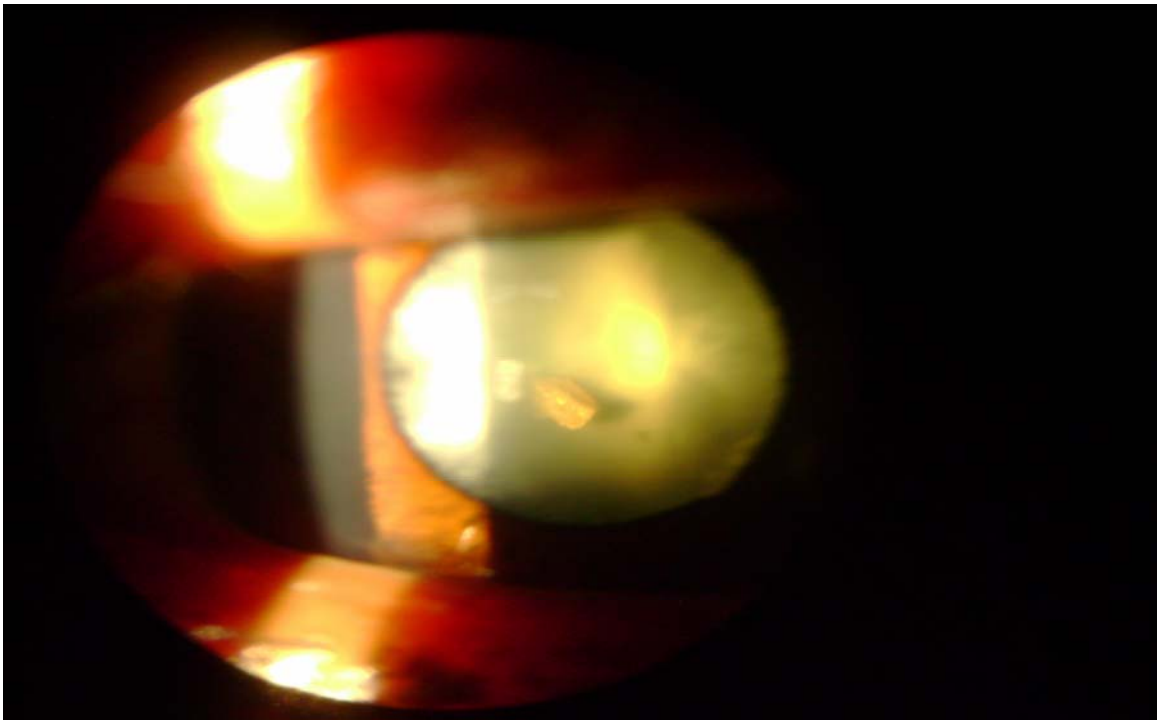


wound of entry



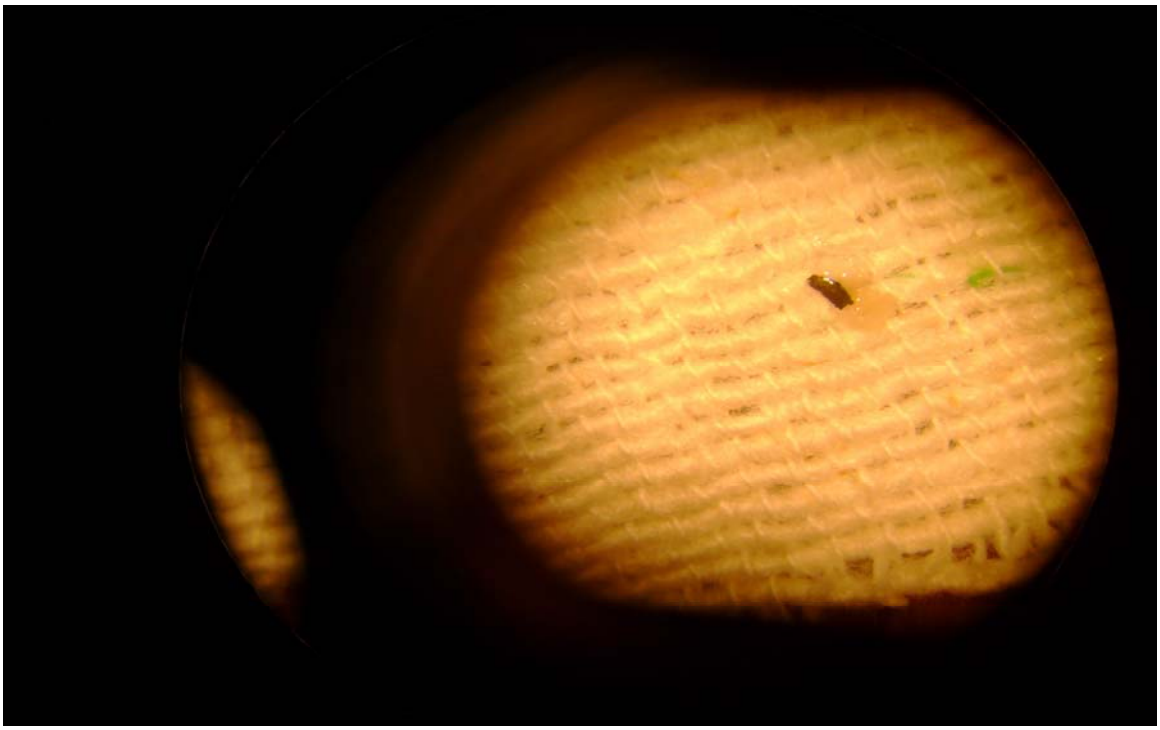
AC foreign body

foreign body after removal

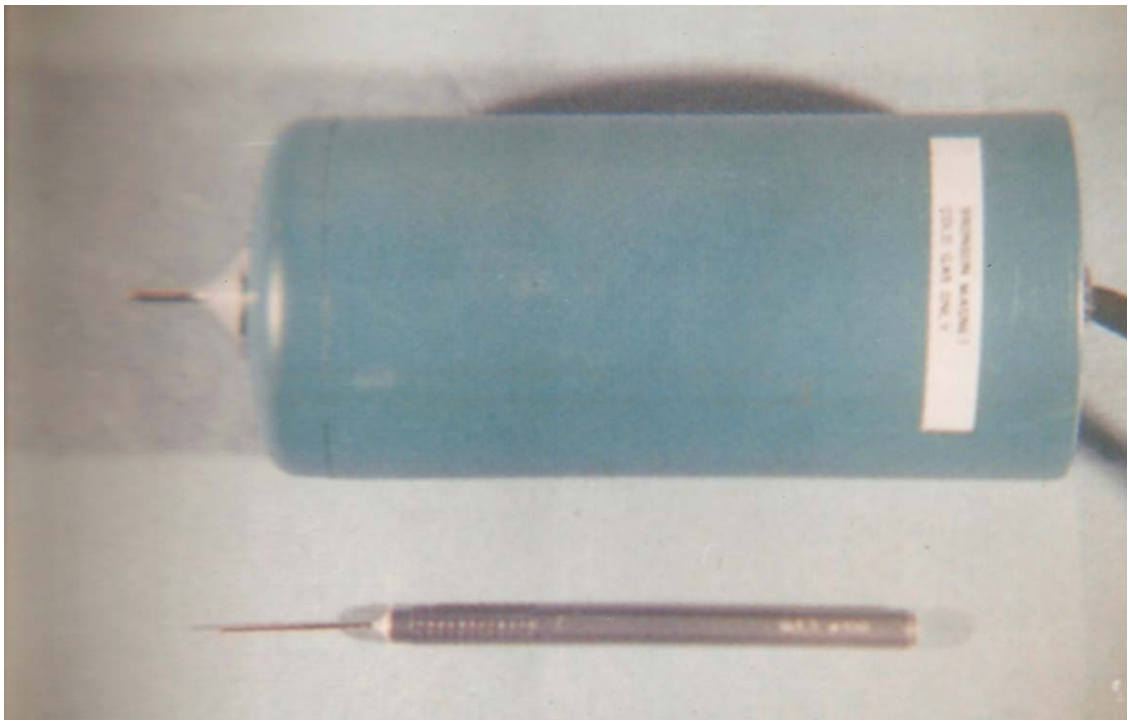


Intra lenticular foreignbody

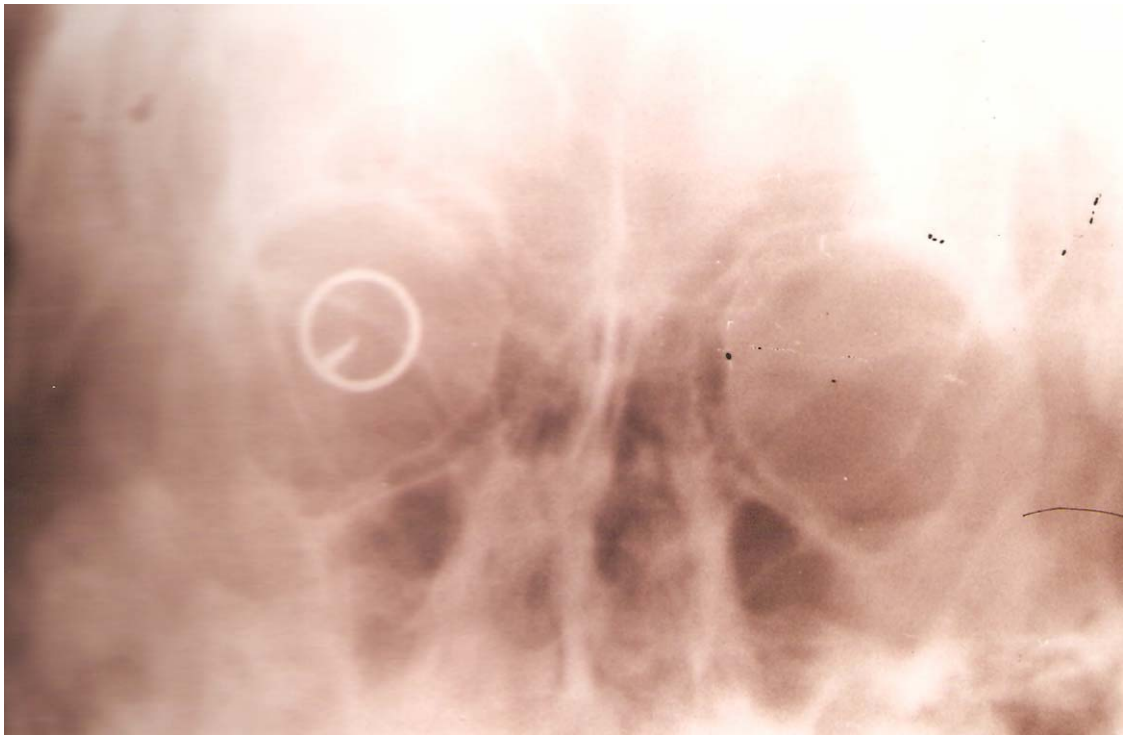
Foreignbody penetrating cornea with iritis



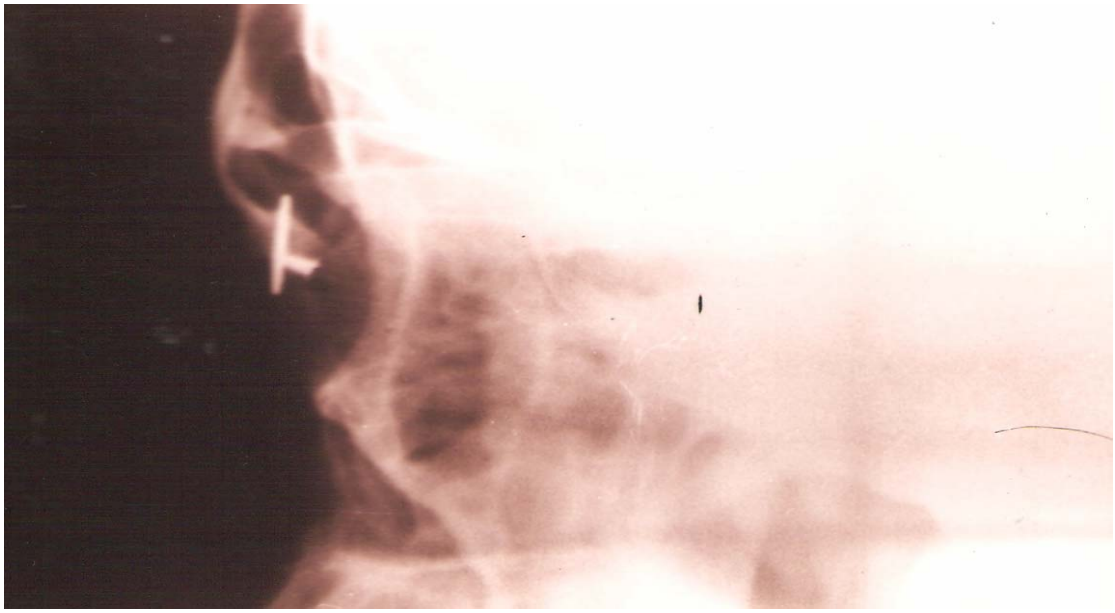
Removed foreignbody



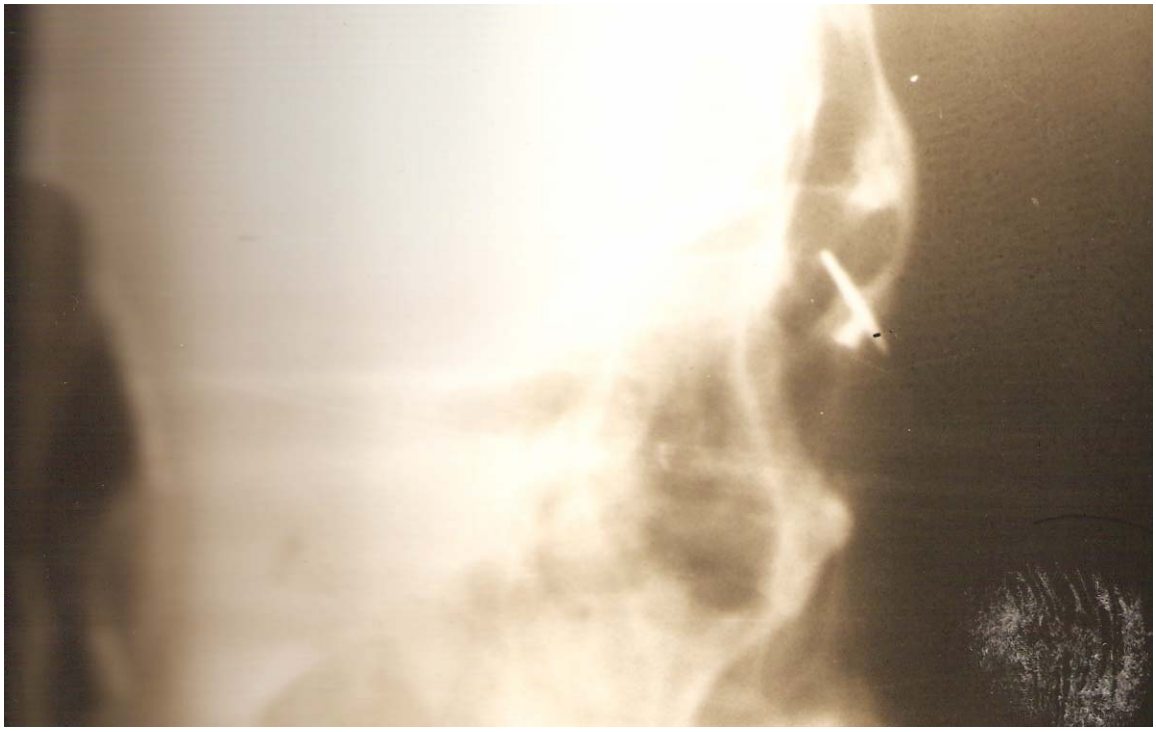
Giant magnet with intra ocular magnet



limbal ring X-Ray AP view

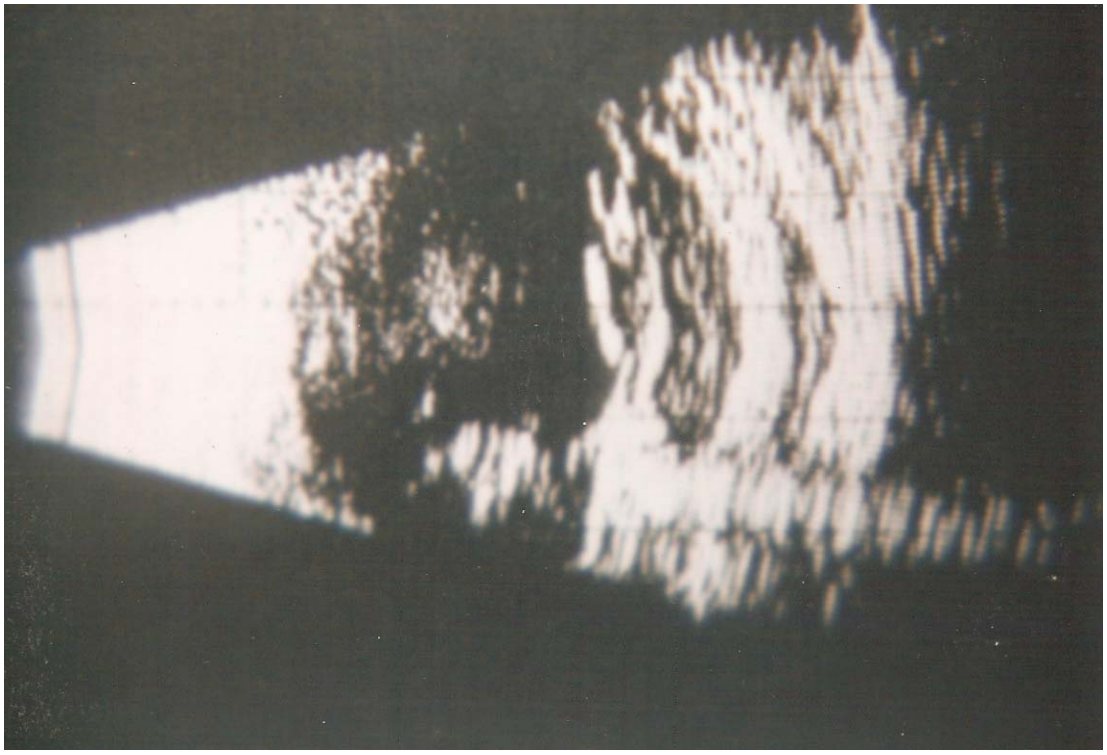


Limbal ring X-Ray lateral

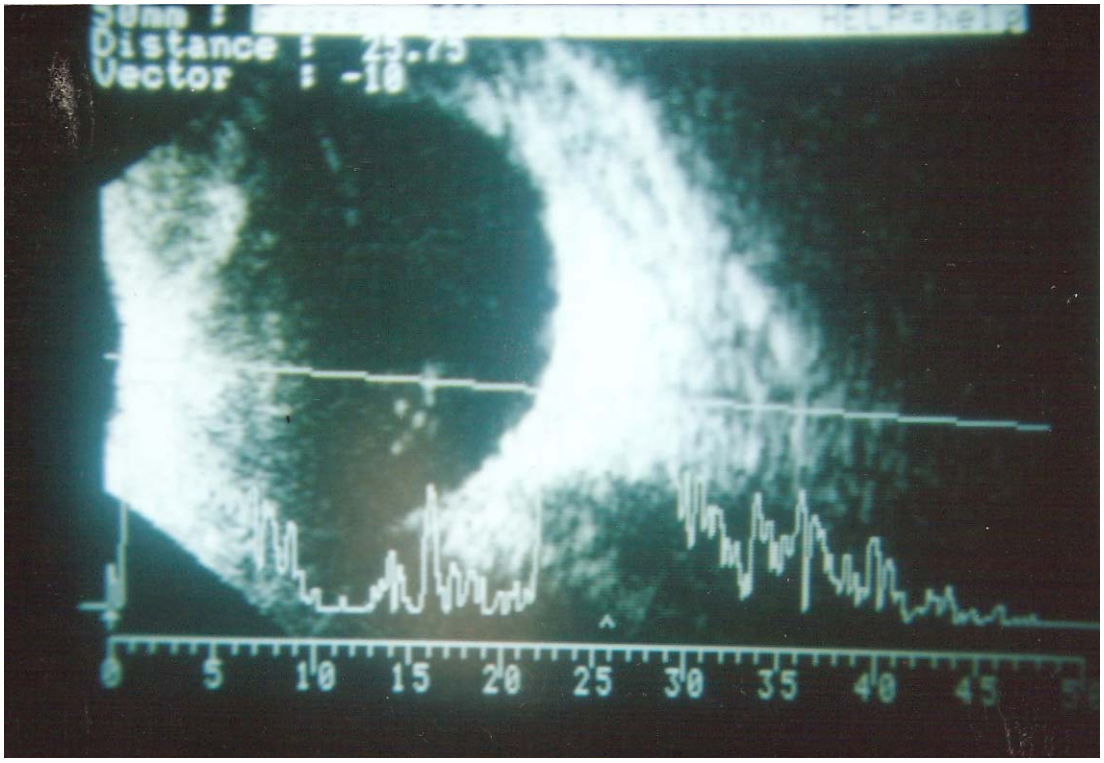


Limbal Ring X-Ray up gaze

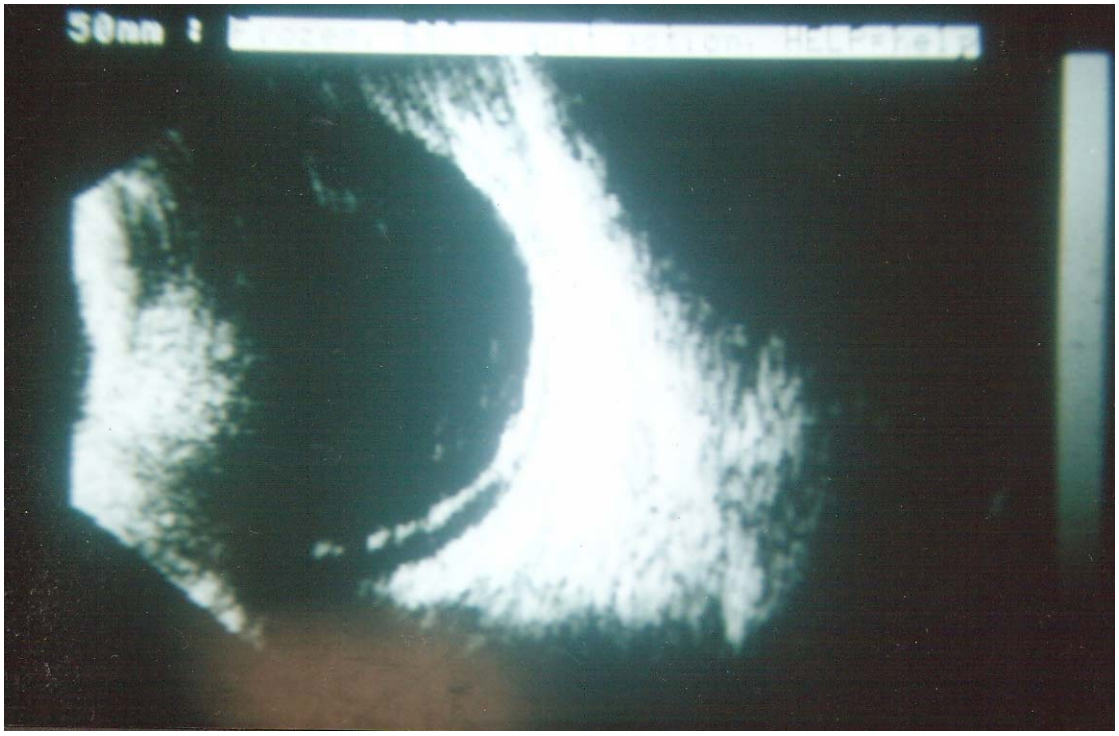
Limbal Ring X-Ray down gaze



B-Scan showing IOFB



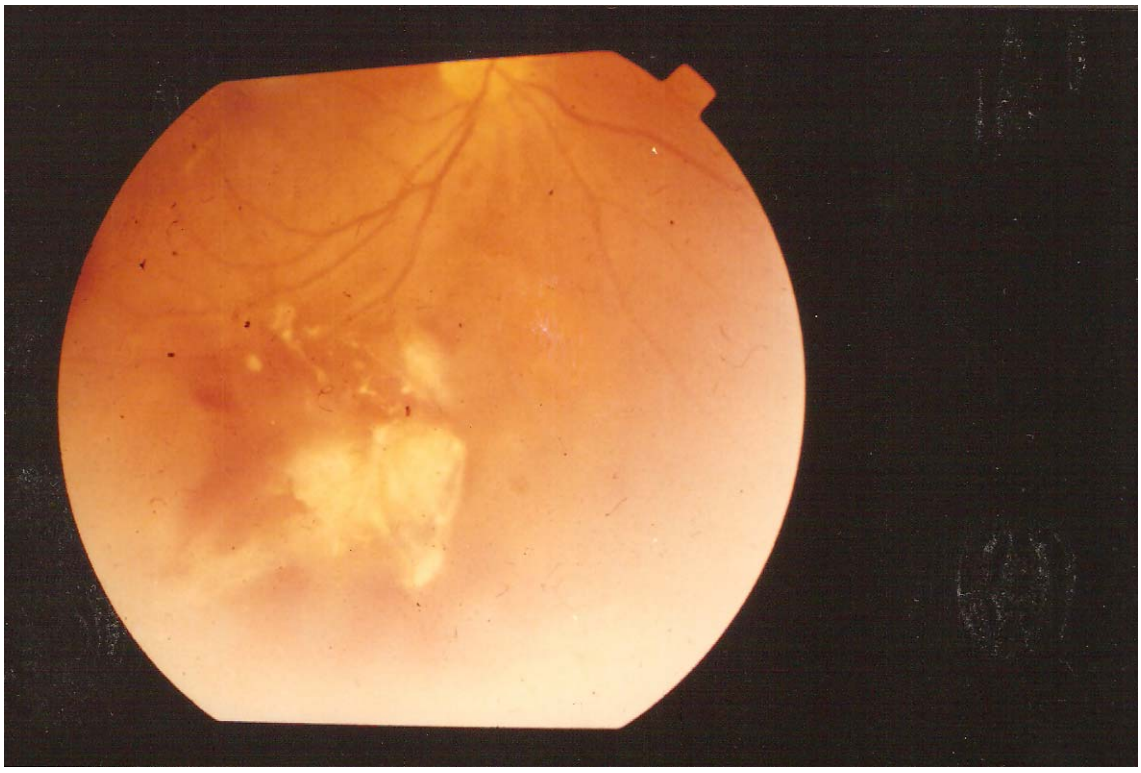
B –Scan with IOFB



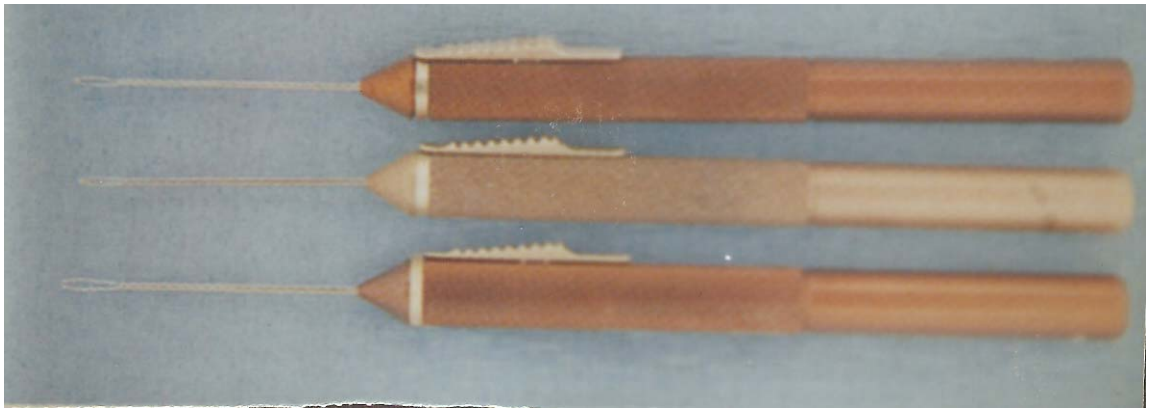
Giant magnet

Gia

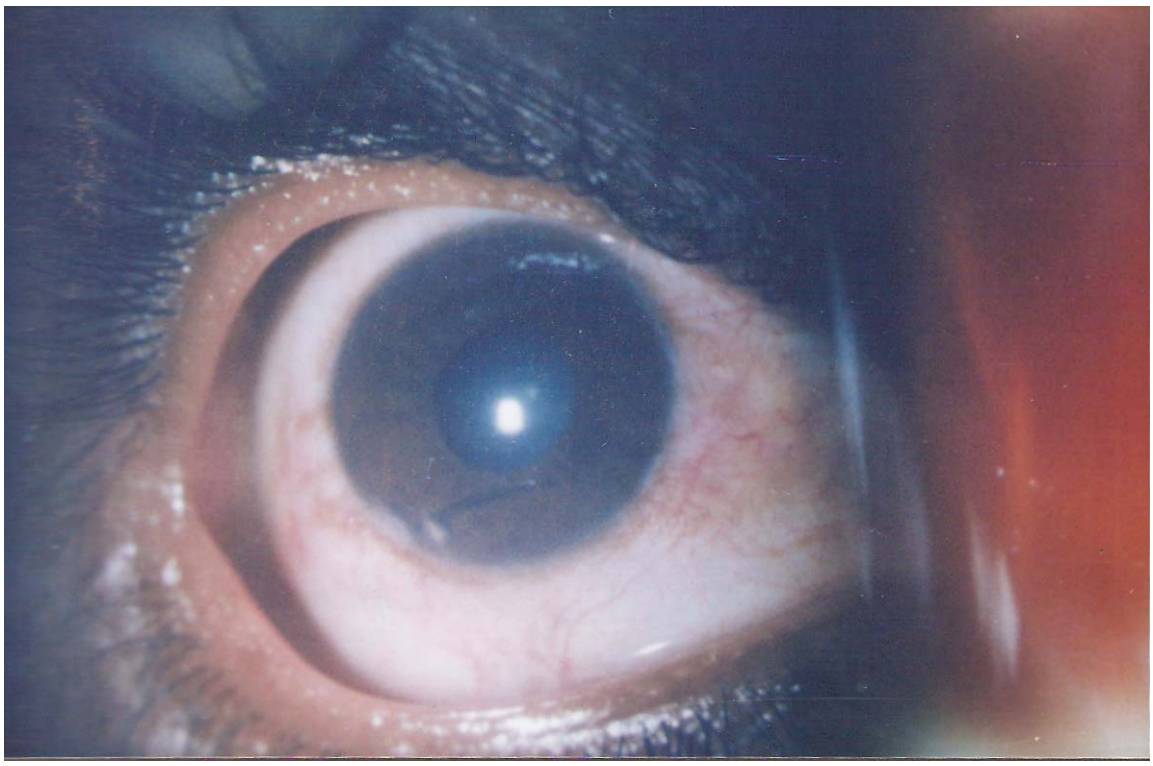
Magnet tips



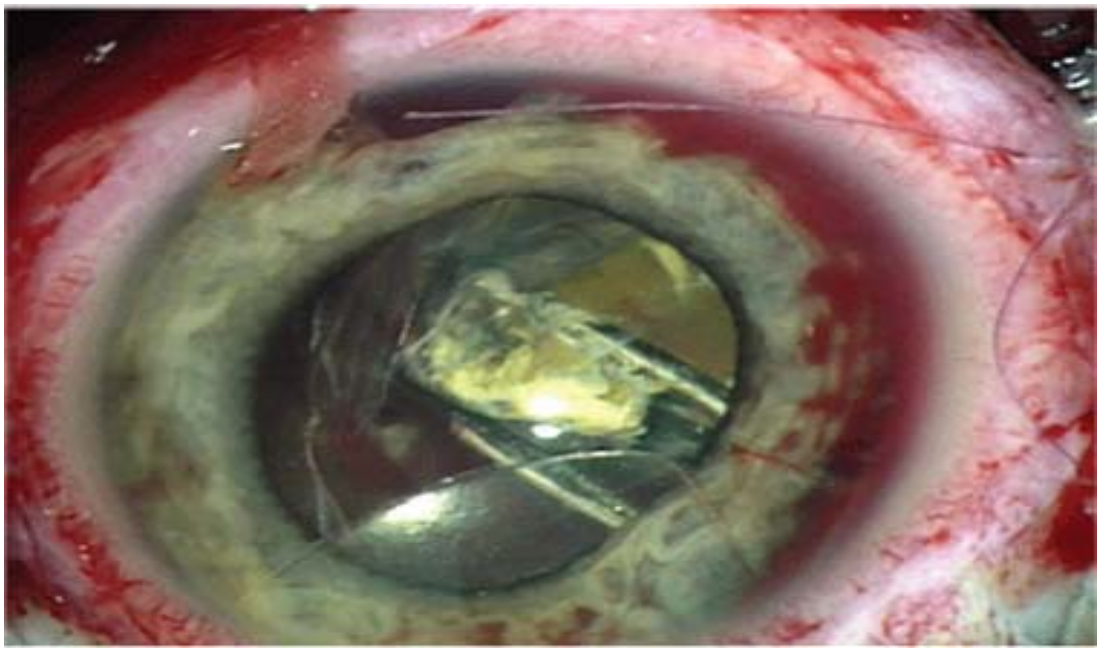
Intra retinal foreign body



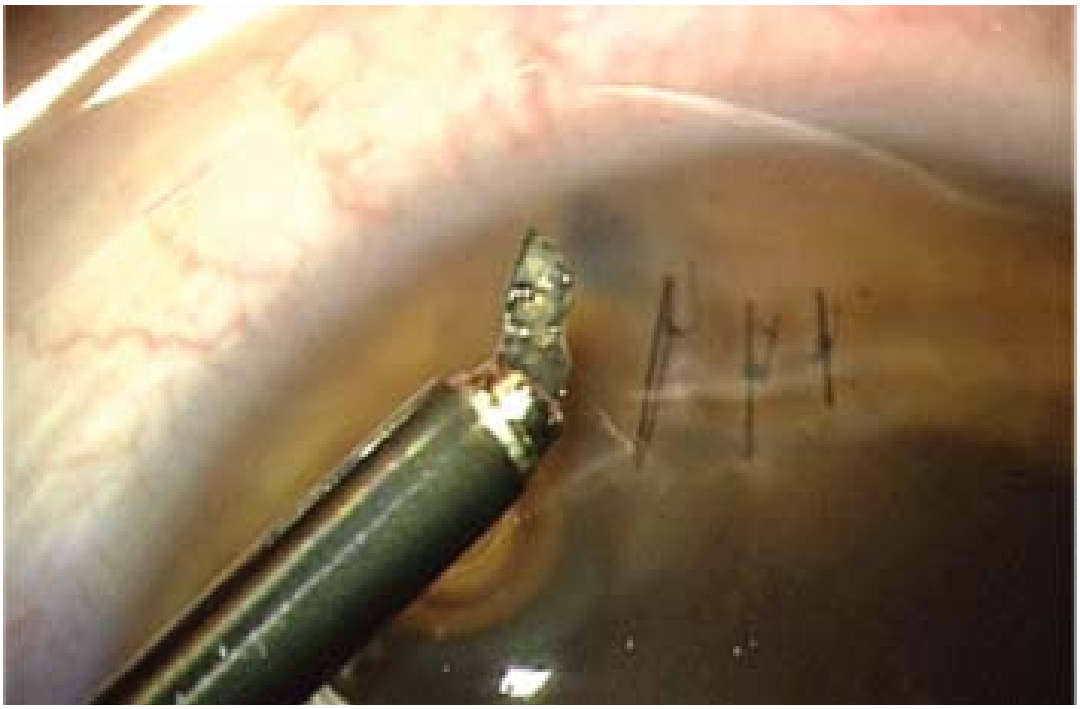
Intra vitreal forceps



Eye lash in AC

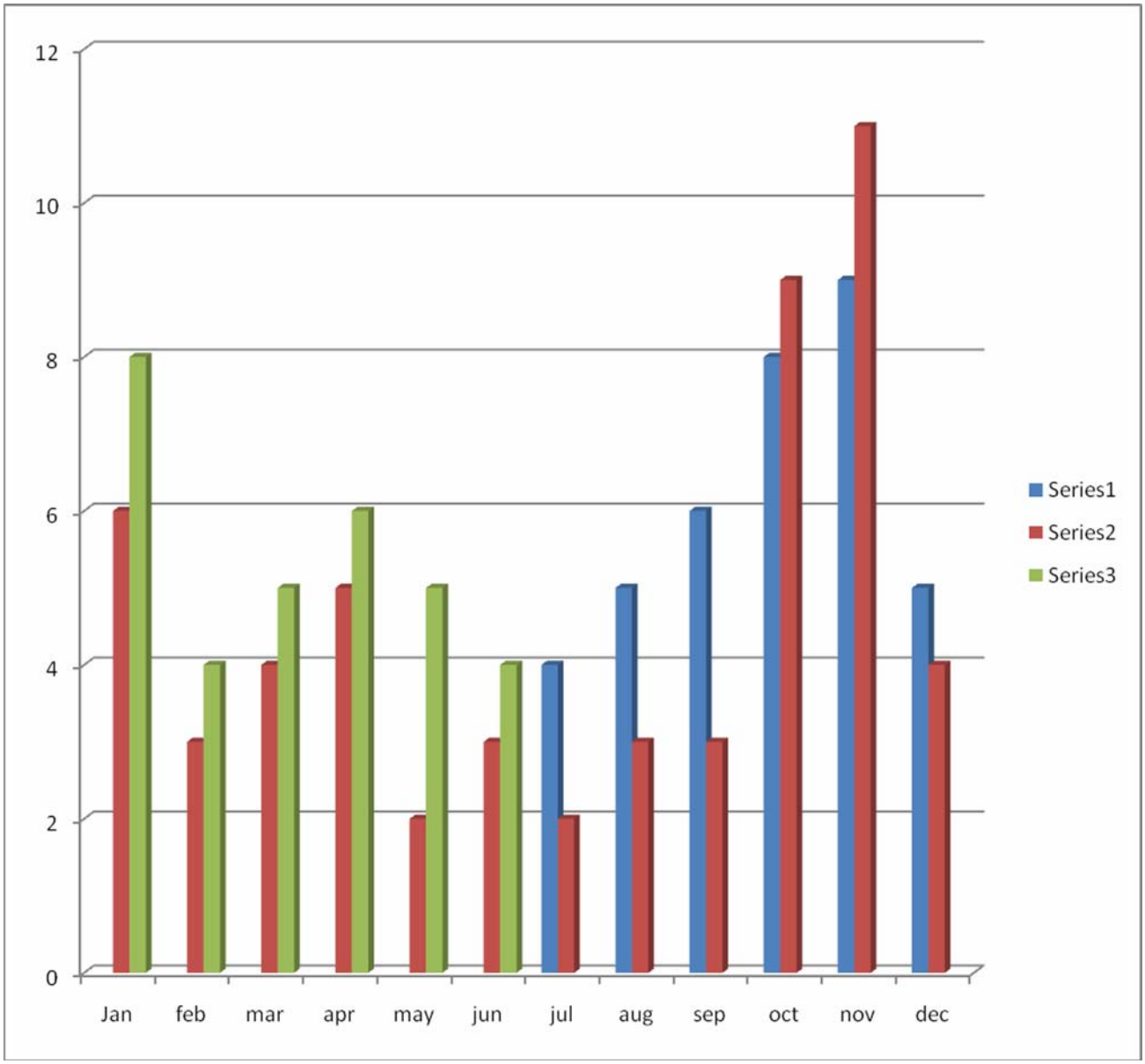


Intravitreal foreign body on removal



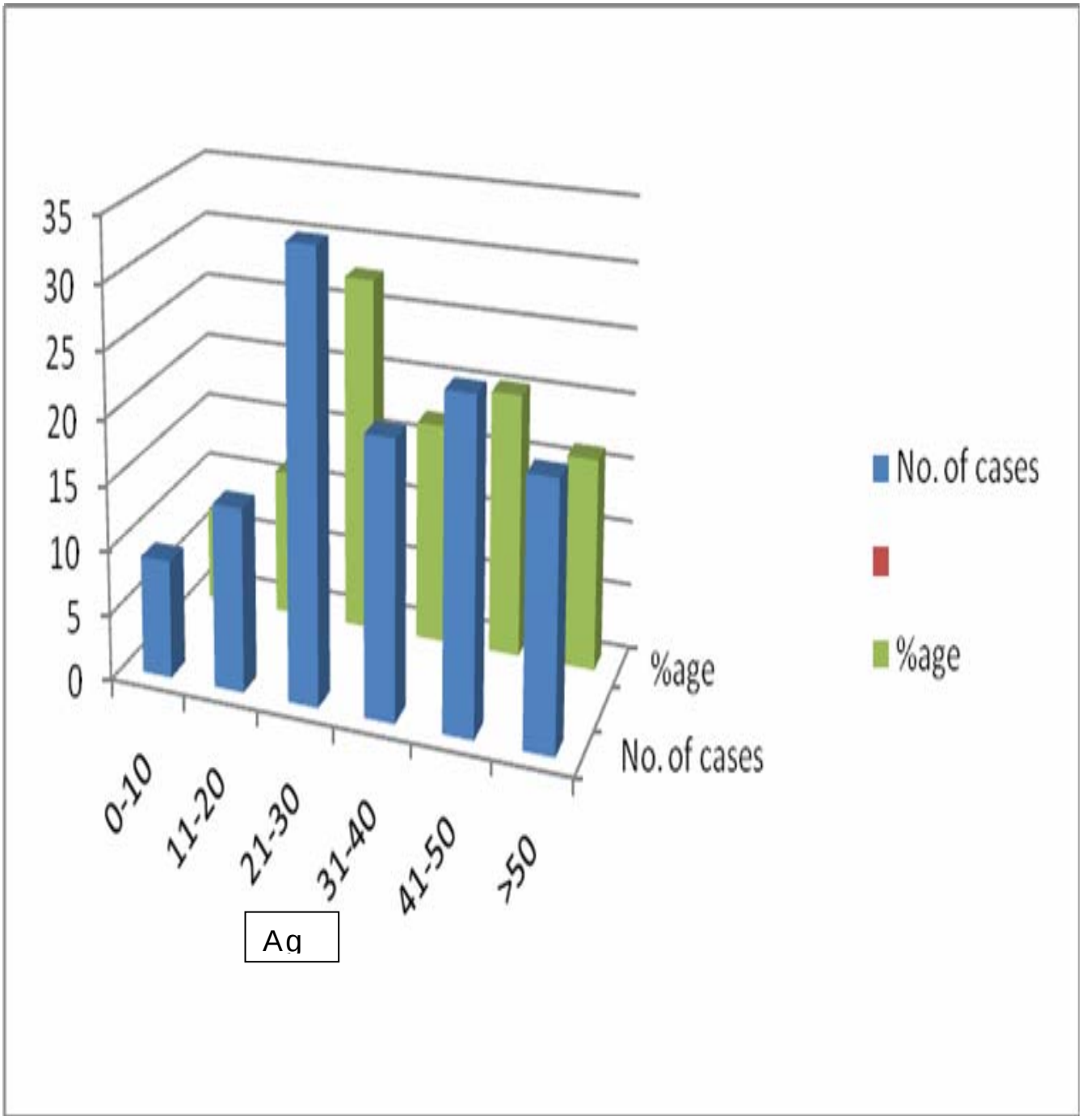
Removed IOFB with corneal sutures

Sl no	name	Age/sex	Ip no	diagnosis	surgery
1	bahadur	65/m	`40126	Mature cataract	ECCE pciol
2	ponnammal	58/f	40324	Nuclear cataract	ECCE pciol
3	devangana	67/f	40169	Mature cataract	SICS pciol
4	Chinnaponnu	72/f	40653	Immature cataract	SICS pciol
5	Kannan	62/m	40584	Immature cataract	SICS pciol
6	Iswar achari	77/m	40816	Chronic dacryocystitis	DCT
7	Ekambaram	54/m	40937	Immature cataract	SICS pciol
8	Duraisami	48/m	41525	Chronic dacryocystitis	DCR
9	Elumalai	63/m	41365	Nuclear cataract / ACG	Sics pciol/ trab
10	Maria	53/f	41662	Immature cataract	Sics pciol
11	Jayavel	59/m	41596	chalazion	Incision ,curettage
12	Bakthan	66/m	41826	Immature cataract	Sics pciol
13	Kamatchi	58/f	41497	Immature cataract	Sics pciol
14	Govindammal	76/f	41995	Nuclear cataract	Sics pciol
15	Sivaprakash	70/m	41734	endophthalmitis	Intra vitreal antibiotics
16	Rajakantam	60/f	42142	Immature cataract	Sics pciol

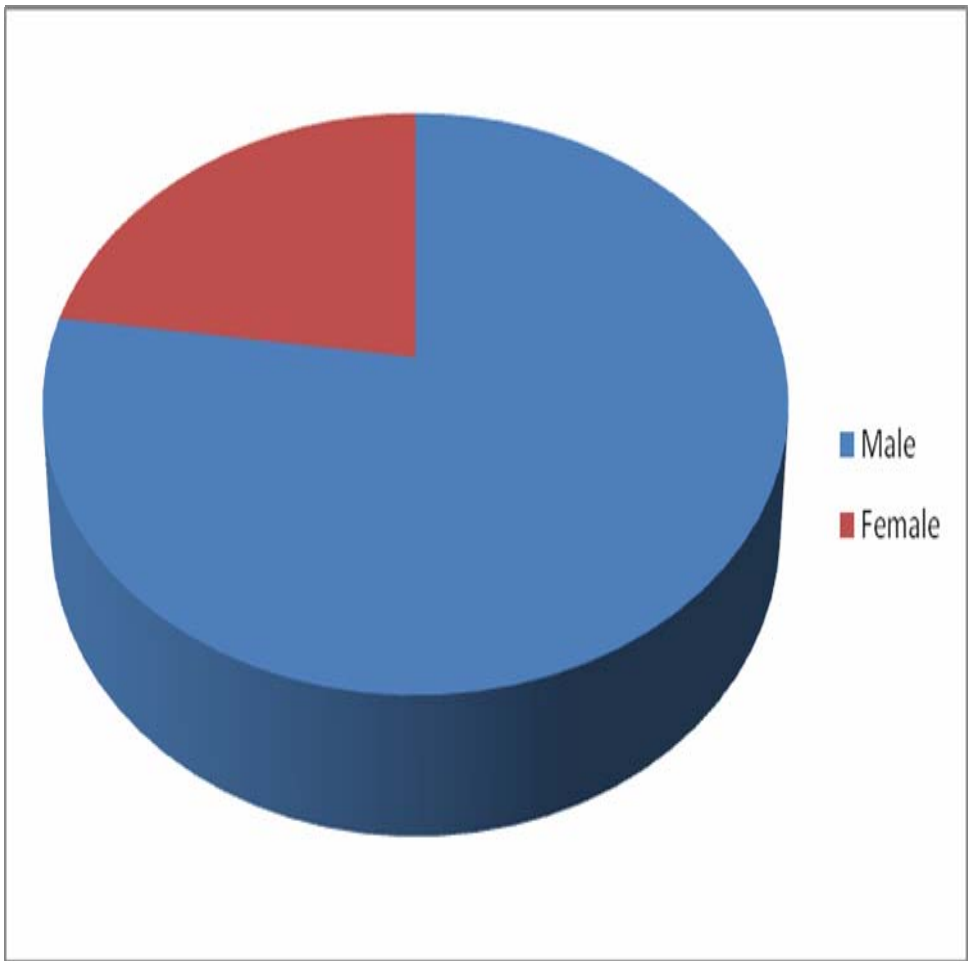


Series 1= Year 2006, Series 2= Year 2007, Series 3= Year 2008

MONTHLY INCIDENCE



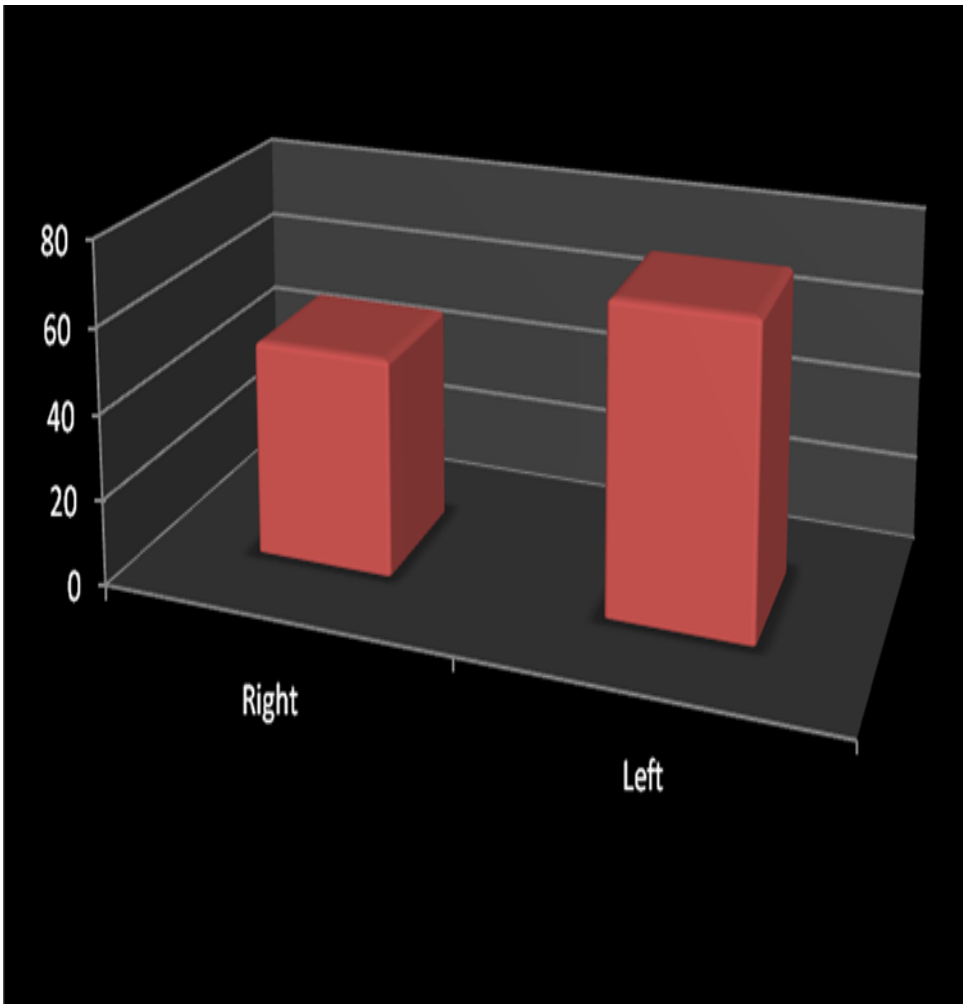
AGE INCIDENCE



Male= 95

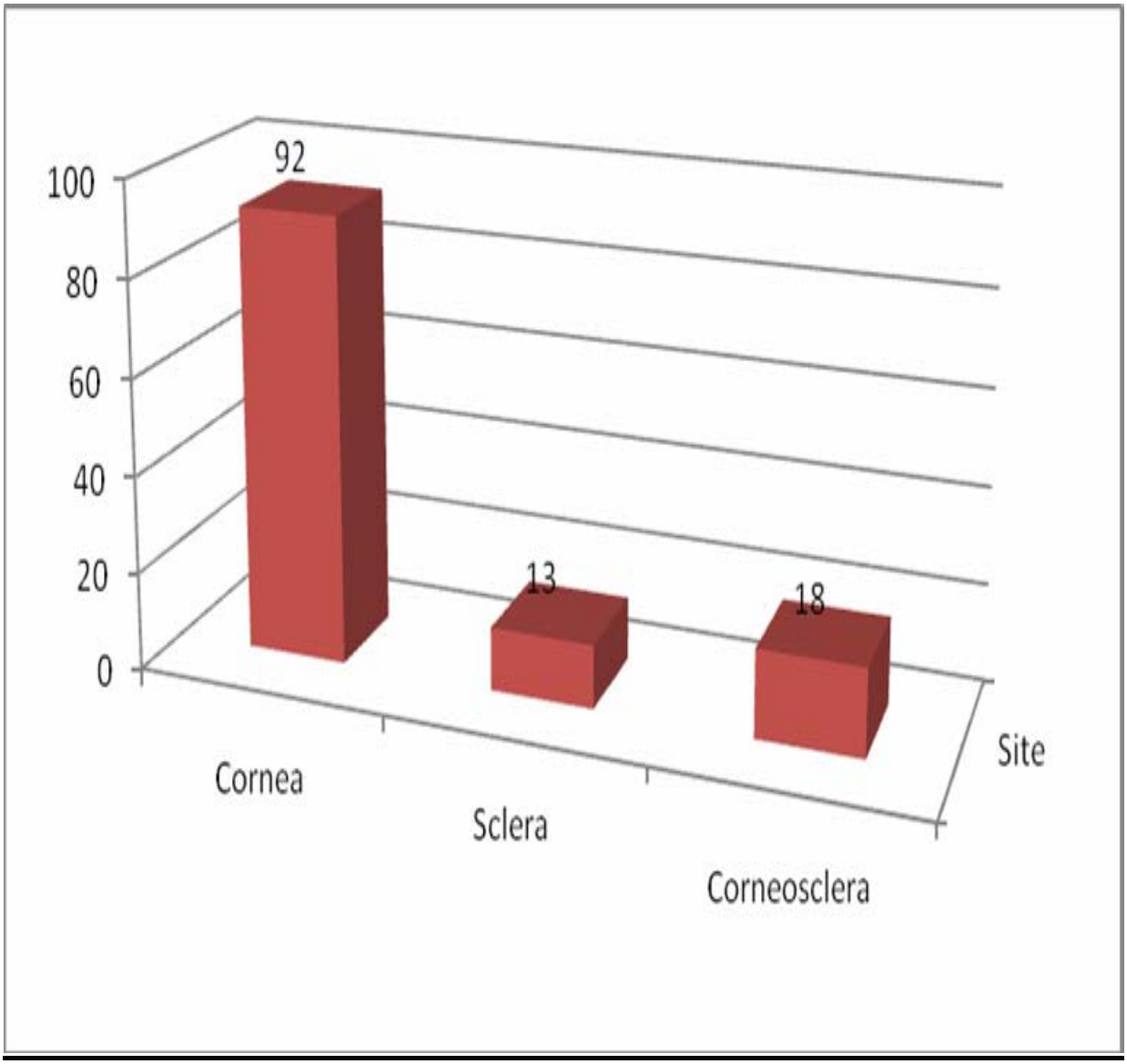
Female = 28

SEX INCIDENCE



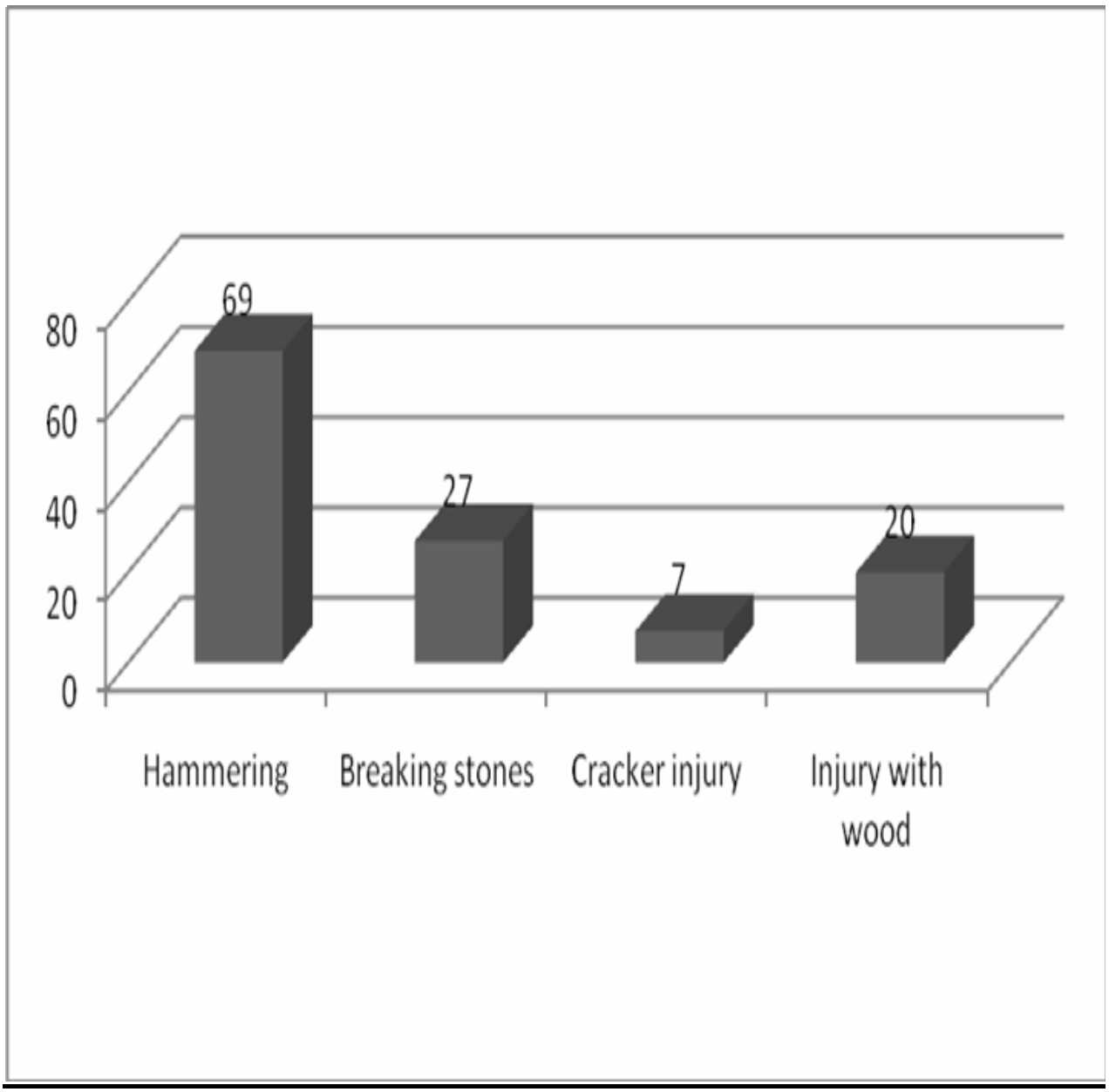
Right eye = 41.46% **Left eye = 58.53%**

EYE INVOLVED

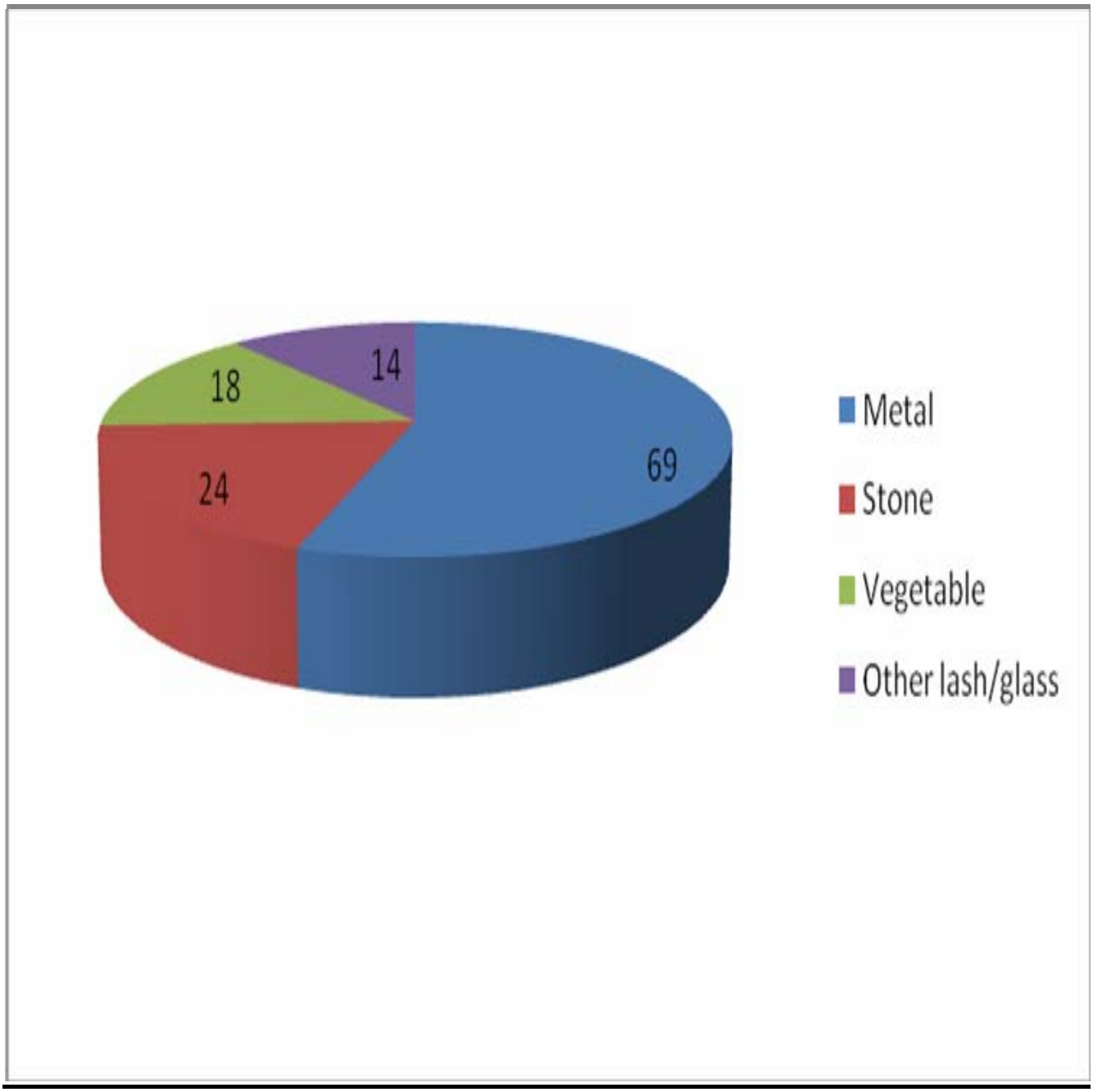


Cornea = 74.79% Sclera= 10.56% Corneosclera=14.63%

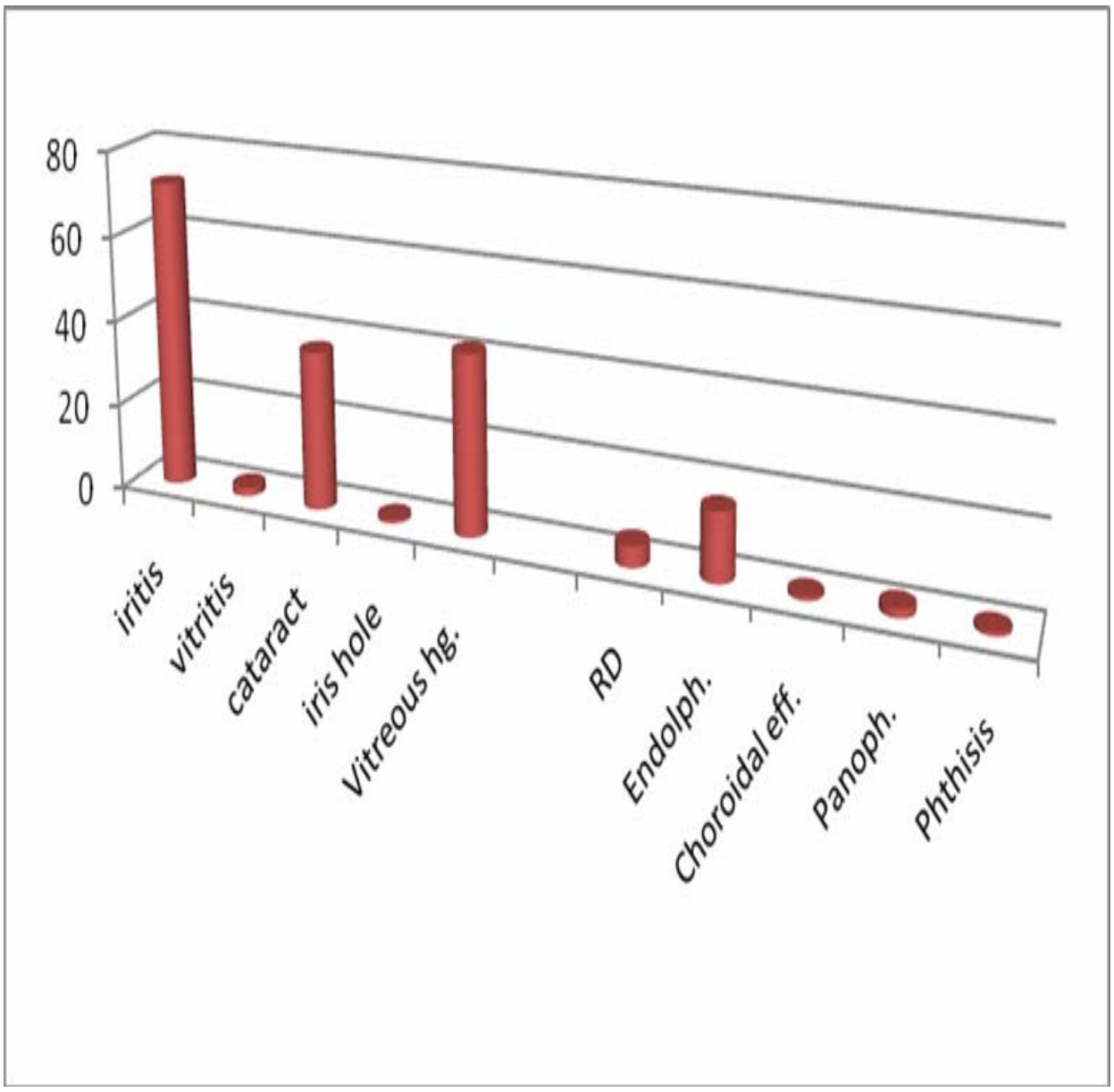
WOUND LOCATION



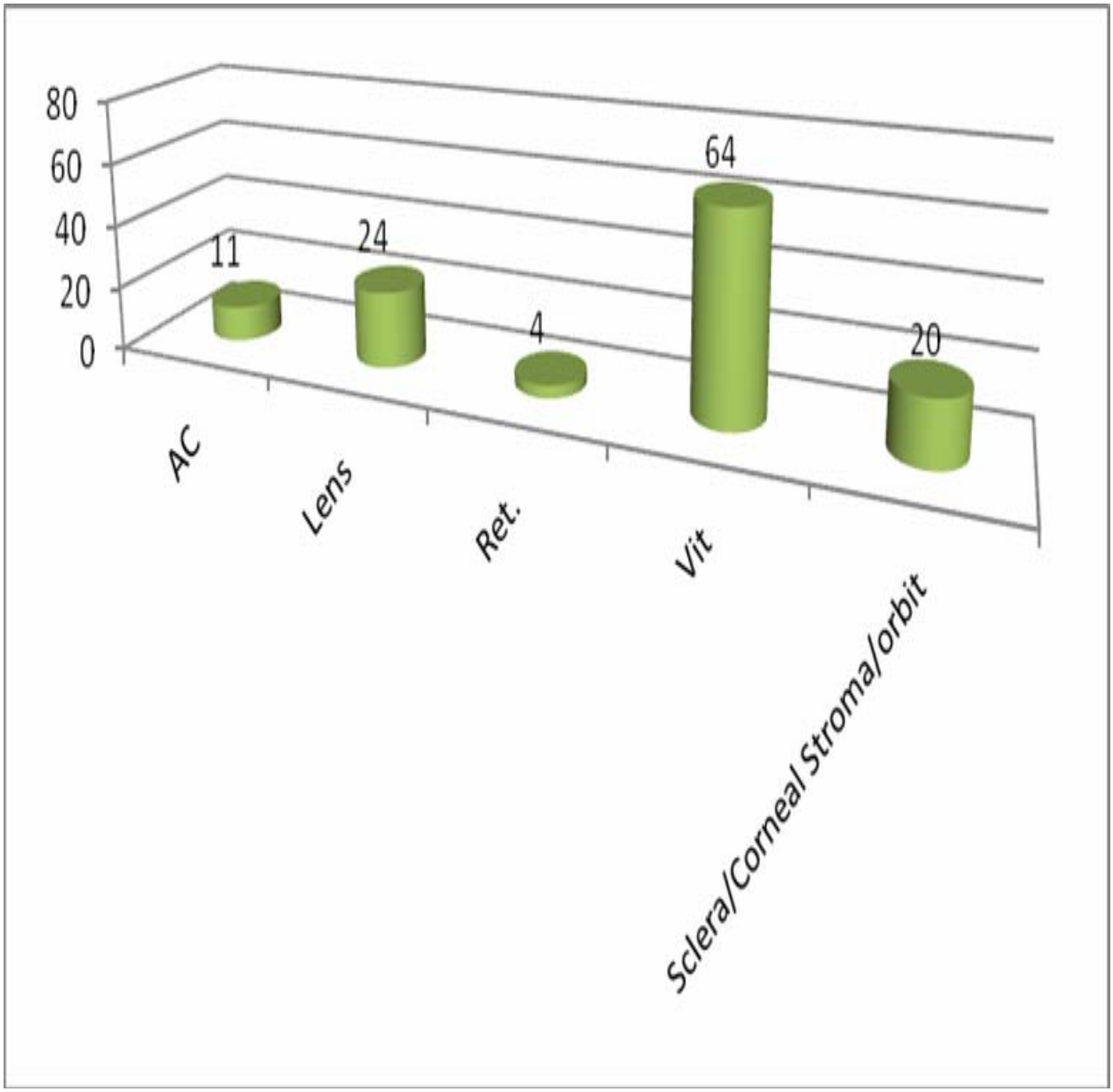
MECHANISM OF INJURY



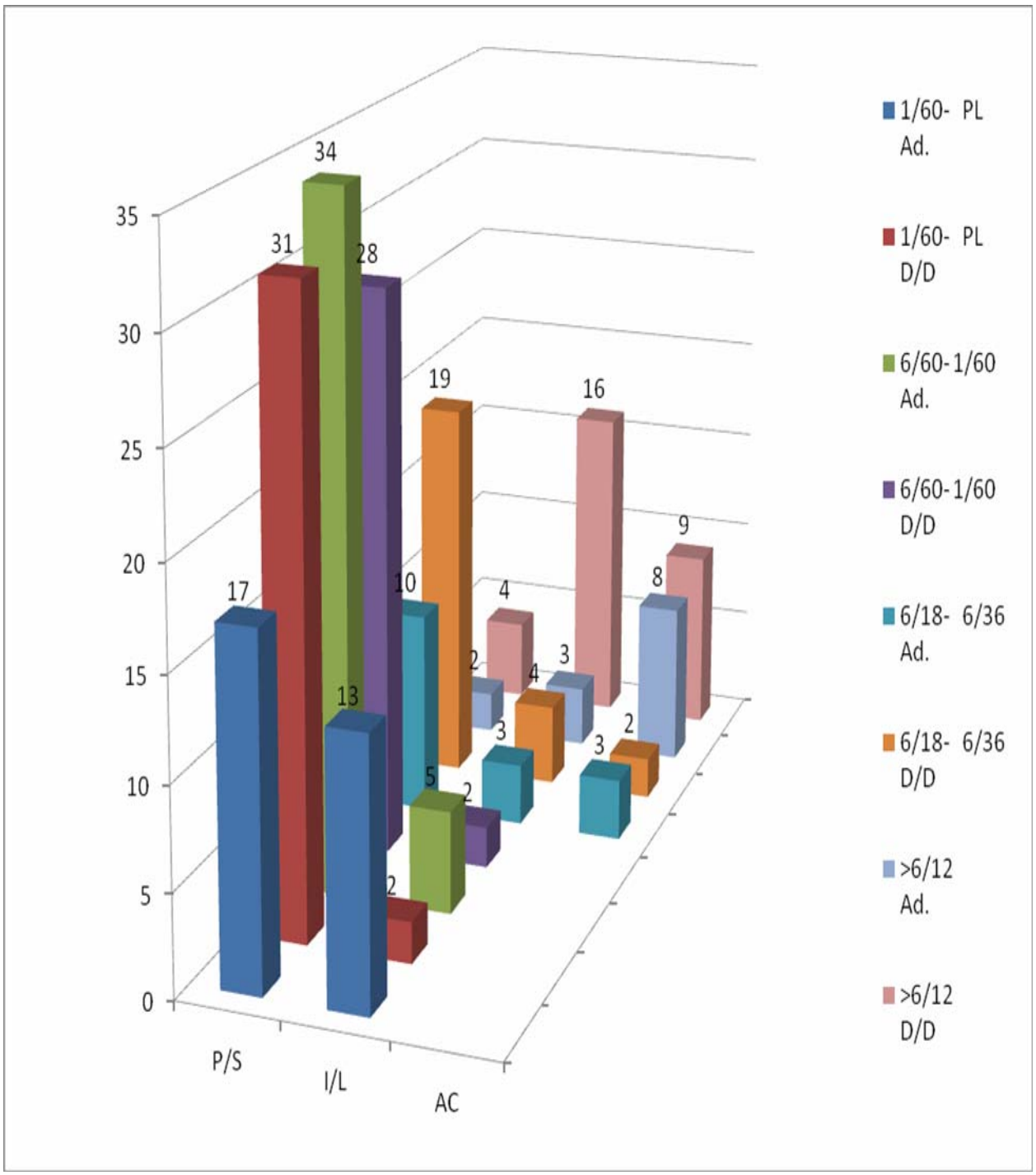
TYPE OF FOREIGN BODY



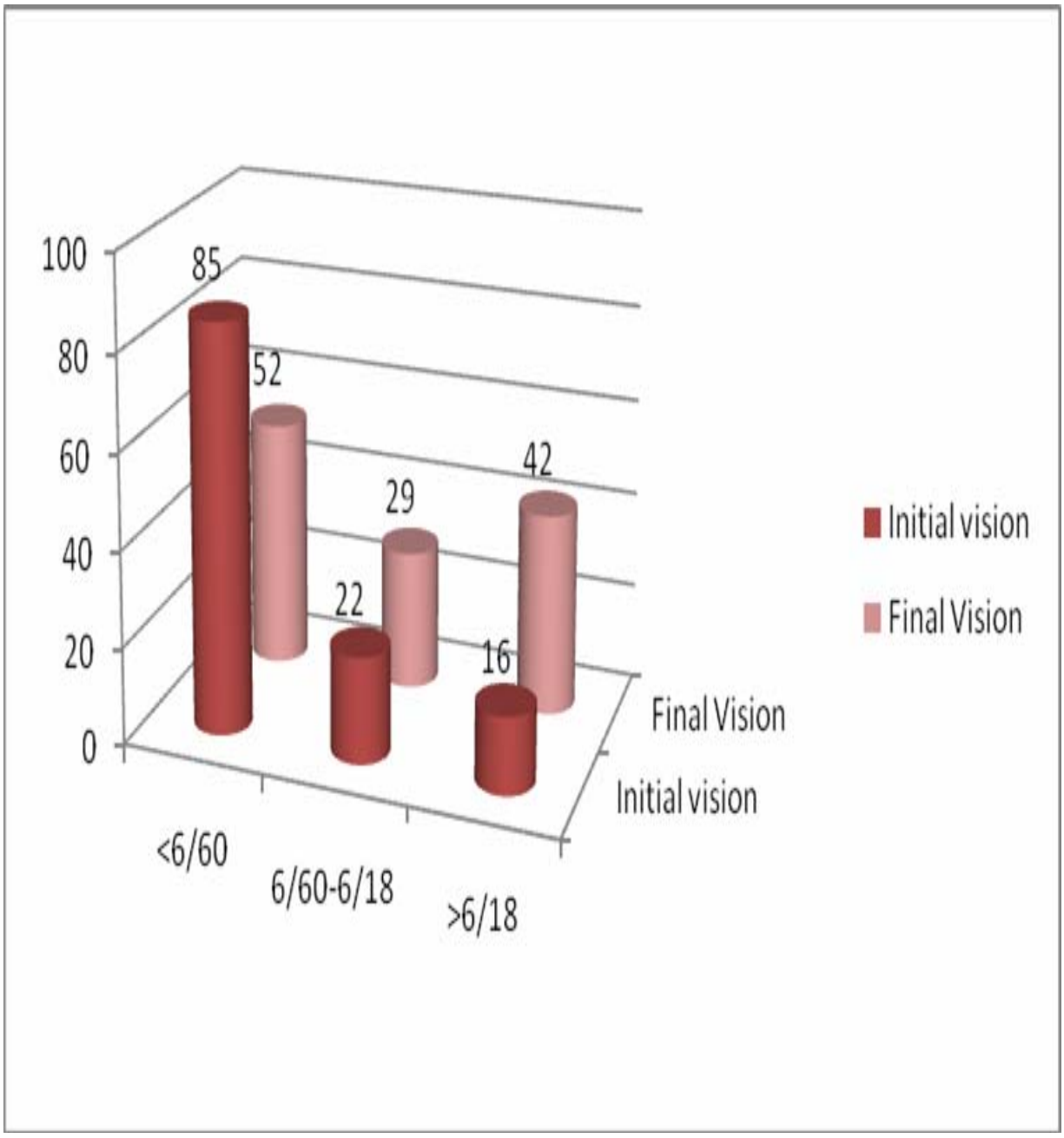
PRESENTATION



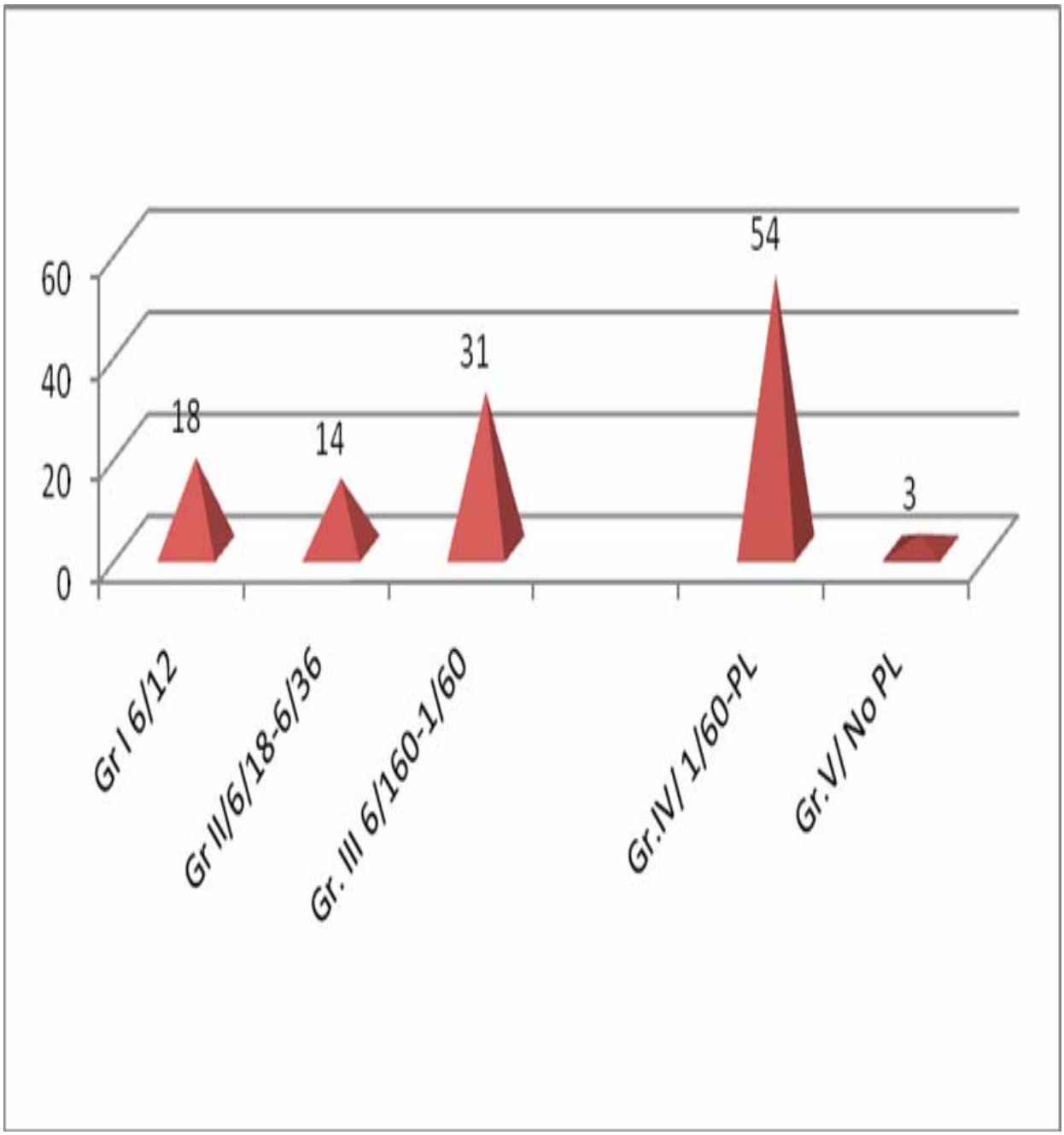
SITE OF FOREIGN BODY LOCATION



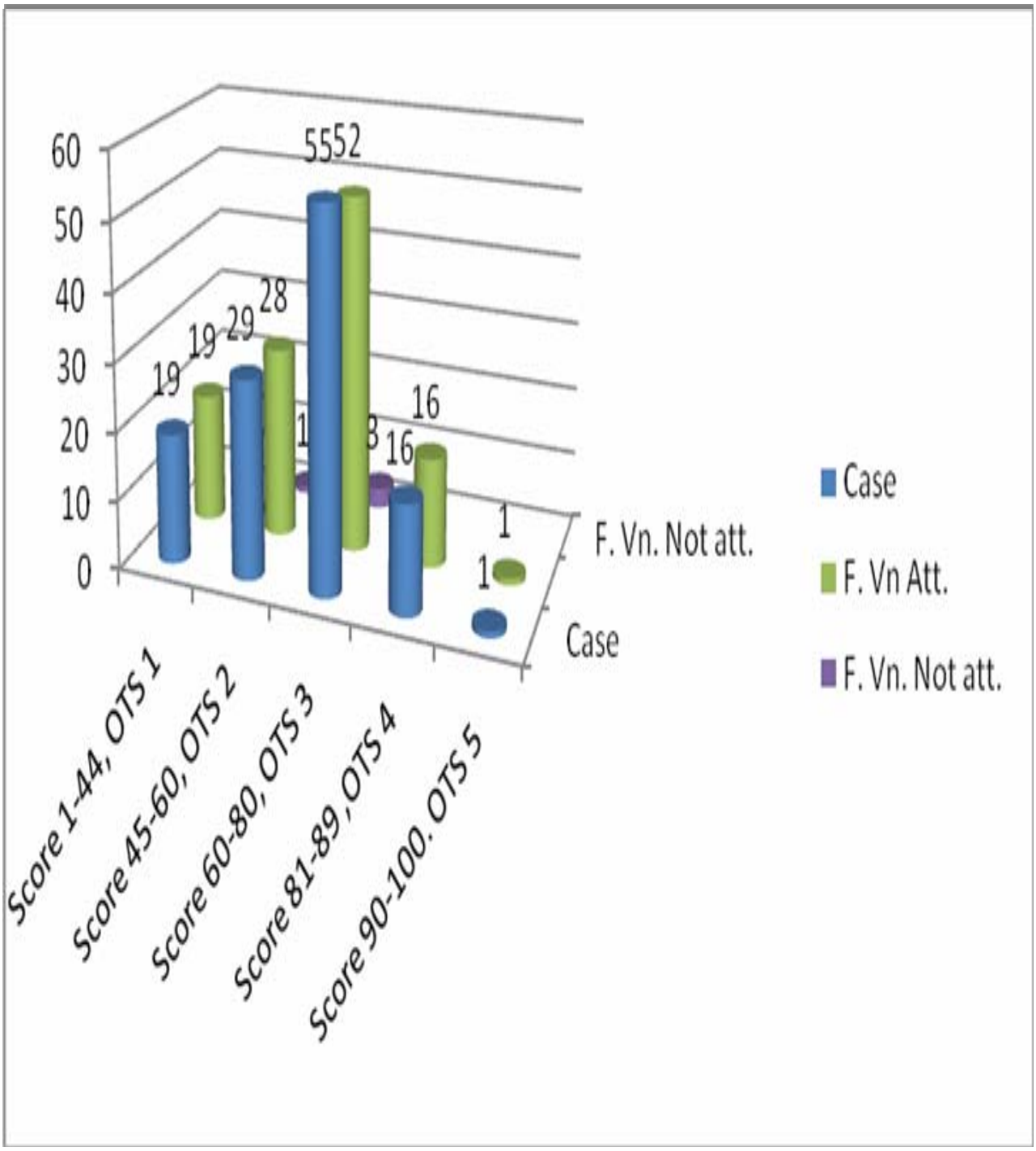
SITE LODGEMENT AND VISION OUTCOME



INITIAL VISION & FINAL VISION OUTCOME



GRADE OF INJURY



EXPECTED VISION AT PRESENTATION&FINALVISION OUTCOME

Sl. No	Name	IP no.	Age/sex	Re/Le	Met/veg/st	Pre.	Conj.	tear	Ac	pupils	iris	Lens	Post seg	Site	V/A ad	V/A d /d	Oth. eye	FB rem.	Oth. Pro.	Late comp.	Score
1	Gajavali	422002	65/F	LE	metal	I	N	NO	N	N	N	Dis.	N	V	1\60	4\60	2\60	PPV	SFIOL	Nil	56
2	vasu	422675	24/M	RE	wood	I	N	NO	N	N	N	N	N	I/O	6\6	6\6	6\6	W.exp	nil	nil	66
3	raman	422186	18/M	RE	glass	I	N	NO	N	N	N	Dis.	N	ps	3\60	6\18	6\6	ppv	SFIOL	Nil	66
4	ruth	421866	61/F	RE	glass	I	N	NO	N	N	N	Dis.	N	ps	1\60	5\60	6\12	ppv	SFIOL	Nil	66
5	kangavalli	421157	20/F	LE	stone	I	C	NO	N	N	N	Dis.	VH	sclera	pl	hm	6\6	ppv	SICS	endoph	39
6	john peter	421465	26/F	RE	metal	I	C	YES	N	N	N	N	N	c.str	5\60	6\24	6\6	forceps	nil	Nil	66
7	venkatesan	421507	27/M	LE	metal	I	C	YES	S	N	N	N	N	c.str	6\60	6\18	6\12	forceps	nil	Nil	76
8	shanmugam	421158	41/M	RE	metal	I	C	YES	N	N	N	N	N	sclera	6\9	6\9	6\6	forceps	suture	Nil	86
9	muthu	421488	25/M	LE	glass	I	SCH	YES	N	N	N	N	N	sclera	nopl	nopl	6\6	forceps	repair	Nil	23
10	chellakili	422607	12/F	LE	metal	L	SCH	YES	N	S	EX.M	N	N	c.str	6\36	6\12	6\6	forceps	suture	Nil	76
11	bhoopalan	421810	50/M	RE	stone	I	N	NO	N	N	N	N	VH	sclera	pl	pl	6\9	forceps	ppv	endoph	37
12	sekhar	422250	44/M	LE	metal	I	C	YES	FB	N	N	N	VH	AC	pl	pl	6\9	forceps	nil	Nil	56
13	ayyanar	422326	32/M	LE	metal	I	C	NO	N	N	N	C	VH	L	pl	hm	6\6	PPV	ppv	Nil	56
14	chinnan	422218	47/M	LE	stone	I	C	YES	S	N	N	N	N	sclera	cfcf	1\60	6\18	PPV	ppv	Nil	66
15	muthu	423682	28/M	RE	metal	I	C	YES	N	N	N	C	N	L	1\60	6\18	6\6	GM	SICS	Nil	66
16	sholanath	423641	24/M	RE	metal	I	C/SCH	NO	N	N	N	C	N	sclera	6\6	6\6	6\6	forceps	nil	Nil	86
17	ibrahim	423364	23/M	LE	wood	I	C	YES	N	RAPD	N	N	N	AC	6\36	pl	6\6	forceps	suture	Nil	66
18	anandan	425095	45/M	LE	veg	I	N	NO	N	N	N	N	N	AC	2\60	6\18	6\6	forceps	nil	Nil	66
19	sivalingam	425281	36/M	LE	glass	I	SCH	NO	N	N	N	N	N	AC	PL	PL	6\24	forceps	nil	endoph	39
20	diwakar	424465	25/M	LE	metal	I	N	NO	N	N	N	FB	N	L	6\6P	6\6	6\6	GM	SICS	Nil	86
21	dillibabu	421334	30/M	LE	metal	I	SCH	NO	N	N	N	N	N	sclera	6\6	6\6	6\6	GM	suture	Nil	86
22	natarajan	425521	30/M	RE	metal	L	N	YES	N	N	N	N	N	V	PL	HM	6\6	GM	nil	Nil	56
23	ezhumalai	426183	45/M	LE	metal	I	SCH	NO	N	N	N	N	N	V	6\12	6\6	6\6	GM	nil	Nil	86
24	muthu	426027	19/M	LE	metal	L	SCH	NO	N	N	N	N	N	sclera	6\6	6\6	6\6	forceps	nil	Nil	96
25	chithiravel	423089	35/M	RE	metal	I	SCH	NO	N	N	N	N	N	V	PL	PL	6\6	GM	nil	endoph	37
26	murali	425286	28/M	RE	metal	I	SCH	YES	N	N	N	N	N	V	NOPL	NOPL	6\6	NO	eviseratn	panoph	29
27	vinod	425584	21/M	LE	metal	I	SCH	NO	N	N	N	N	VH	V	3\60	1\60	6\6	PPV	ppv	ch. Effn	55
28	tharasi	425798	30/M	LE	metal	I	SCH	NO	N	N	N	N	VH	V	HM	PL	6\60	NO	nil	endoph	39
29	arumugam	427467	46/M	RE	stone	I	SCH	NO	N	N	N	N	R.tear	R	CFCF	1\60	6\12	NO	nil	Nil	56
30	lawrence	426029	38/M	LE	metal	I	C	NO	N	N	N	N	N	V	HM	NOPL	6\12	NO	nil	pthisis	56
31	ezhumalai	626534	42/M	LE	metal	I	C	NO	N	N	N	N	N	V	PL	PL	6\6	PPV	nil	Nil	56
32	mastan	426776	30/M	LE	metal	L	C	YES	N	N	N	C	N	L	2\60	2\60	6\6	forceps	SICS	Nil	66
33	kamkannan	413065	35/M	LE	stone	I	C	YES	S	N	N	N	VH	R	PL	6\18	6\9	NO	nil	Nil	66
34	gunasekaran	413655	27/M	RE	metal	I	C	YES	S	N	N	N	VH	V	PL	PL	6\6	GM	suture	Nil	56
35	balaji	414539	20/M	LE	metal	I	C	YES	N	N	N	N	VH	V	PL	PL	6\6	NO	suture	RD	45
36	ranganathan	416087	35/M	LE	stone	L	C	YES	N	N	N	C	N	L	6\36	6\9	6\9	forceps	SICS	Nil	76
37	kavitha	416653	2/F	RE	veg	I	C	YES	N	N	N	N	N	c.str	?	?	?	forceps	nil	MAC.OP	NO
38	asees	416585	8/M	LE	veg	I	C	NO	N	N	N	N	N	limbus	6\12	6\9	6\6	forceps	nil	Nil	86
39	suresh	416612	13/M	LE	veg	I	C	YES	N	N	N	N	N	c.str	6\18	6\6	6\6	forceps	nil	Nil	76
40	kamatchi	417020	1/F	RE	veg	I	C	NO	N	N	N	N	N	sclera	?	?	?	forceps	w\ex	Nil	NO
41	vanitha	417481	43/F	RE	metal	L	C	NO	yphem	sluggish	N	N	VH	sclera	CFCF	1\60	6\18	forceps	cryo	inf sh RD	45
42	durai	418660	45/M	LE	stone	L	SCH	YES	N	sluggish	CPA	N	VH	sclera	PL	PL	6\6	forceps	nil	endoph	39
43	sundarraj	419041	18/M	RE	metal	I	SCH	YES	N	N	N	N	VH	V	HM	HM	6\6	forceps	ppv	Nil	36
44	heeria	419328	46/M	RE	metal	I	C	YES	N	N	N	C	VH	L	1\60	6\12	6\6	forceps	SICS	Nil	66
45	rudramrty	418785	8/M	RE	LASH	I	C	YES	N	N	N	N	VH	AC	PL	6\60	6\9	SIMCOE	nil	Nil	56
46	kamal	419515	10/M	RE	glass	I	C	YES	FB	N	N	N	N	AC	6\12	6\6	6\6	forceps	nil	Nil	86
47	mallaya	419337	42/M	LE	stone	I	C	YES	S	N	N	C	N	AC	HM	6\24	6\12	forceps	SICS	Nil	56

48	murugan	419650	45/M	RE	stone	I	N	NO	N	N	N	C	N	L	1\60	6\36	6\6	forceps	SICS	Nil	56
49	nagoor	419834	12/M	LE	stone	I	C	NO	N	N	N	N	N	c.str	1\60	6\18	1\60	forceps	nil	Nil	66
50	kumaresan	414777	22/M	RE	metal	I	C	YES	N	N	N	C	VH	V	3\60	6\24	6\6	PPV	SFIOL	Nil	66
51	parthipan	420706	37/M	RE	metal	I	C	YES	S	N	N	C	N	L	6\9	6\9	6\6	forceps	SICS	Nil	86
52	ragubal	420038	59/M	RE	metal	L	C	YES	N	N	N	C	N	V	HM	2\60	6\9	PPV	SICS	Nil	56
53	xavier	419774	49/M	RE	metal	I	C	NO	S	N	N	C	VH	V	HM	PL	6\6	PPV	nil	endoph	39
54	jyotilingam	420857	58/M	LE	glass	I	C	YES	N	N	N	C	VH	AC	1\60	3\60	6\9	forceps	nil	Nil	66
55	vanamayil	420126	28/F	LE	stone	I	C	YES	S	N	CPA	C	N	R	6\9	6\9	6\6	NO	barrage	Nil	86
56	s moorty	417926	34/M	LE	metal	I	C	YES	N	RAPD	N	C	VH	V	HM	HM	6\6	PPV	SICS	endoph	29
57	manickan	417249	43/M	RE	metal	L	C	YES	N	RAPD	CPA	C	N	V	1\60	1\60	6\6	PPV	SICS	RD	35
58	palani	417641	39/M	LE	veg	I	C	YES	N	sluggish	CPA	N	VH	V	HM	HM	6\6	PPV	nil	endoph	39
59	susila	411545	16/F	LE	veg	I	C	YES	N	N	N	N	VH	V	1\60	HM	6\6	PPV	nil	endoph	49
60	perumal	410812	52/M	LE	metal	I	C	YES	N	N	N	N	N	V	5\60	6\24	6\9	PPV	nil	Nil	66
61	poongavanam	418677	32/F	RE	veg	I	C	YES	EX	N	N	N	N	AC	6\12	6\6	6\6	forceps	nil	Nil	86
62	desammal	418249	68/F	RE	metal	L	C	YES	EX	NRTL	CPA	C	EX	V	nopl	nopl	6\9	NO	eviseratn	panoph	29
63	manu	421029	38/M	LE	metal	I	C	YES	N	N	N	C	N	L	6\18	6\6	6\6	forceps	SICS	Nil	76
64	gopal	413218	52/M	LE	metal	I	N	NO	N	N	N	N	N	AC	6\12	6\12	6\12	forceps	nil	Nil	86
65	m nisha	413648	28/M	RE	stone	I	N	YES	N	N	N	Dis.	N	L	6\18	6\12	6\9	forceps	SICS	Nil	76
66	xavier	413810	48/M	LE	metal	I	N	YES	S	N	CPA	N	VH	V	HM	HM	6\18	PPV	nil	endoph	39
67	kamala	414012	32/F	LE	metal	I	C	NO	N	N	N	N	N	R	6\9	6\9	6\9	NO	barrage	Nil	86
68	antonama	415037	58/F	RE	stone	I	N	YES	N	N	N	Dis.	VH	sclera	6\18	6\9	6\9	forceps	nil	Nil	76
69	chinnaya	419100	48/M	RE	veg	I	N	NO	N	N	N	N	VH	V	2\60	5\60	6\12	PPV	ppv	Nil	66
70	ponnusami	417694	36/M	LE	metal	I	C	YES	N	N	N	N	N	V	6\60	6\24	6\9	PPV	ppv	Nil	76
71	ch. Durai	417488	65/M	LE	metal	L	N	NO	N	N	CPA	N	VH	V	1\60	HM	6\18	PPV	ppv	Nil	49
72	kamal	411187	28/M	RE	metal	I	C	YES	S	N	N	C	N	V	6\24	6\12	6\6	PPV	ppv	Nil	76
73	abdulhasan	416230	30/M	LE	metal	I	N	YES	N	N	N	Dis.	N	L	6\18	6\9	6\9	forceps	nil	Nil	76
74	chokalingam	412159	40/M	RE	stone	I	N	YES	N	N	N	C	VH	L	6\60	6\12	6\6	forceps	nil	Nil	76
75	joshwa	413424	43/M	LE	metal	I	N	NO	N	N	N	Dis.	N	L	4\60	6\24	6\6	forceps	nil	Nil	66
76	sreedevi	418645	16/M	LE	stone	I	C	YES	S	N	N	N	N	V	6\36	6\18	6\6	PPV	nil	Nil	76
77	pappammal	419327	67/F	LE	stone	L	C	YES	N	RAPD	N	C	VH	V	HM	HM	6\12	PPV	nil	RD	35
78	dinkar	419618	9/M	RE	glass	I	N	NO	N	N	N	C	VH	V	4\60	6\60	6\12	PPV	nil	Nil	66
79	subbaiah	423566	81/M	LE	stone	I	C	YES	N	N	N	C	N	V	6\60	6\36	6\24	PPV	nil	Nil	76
80	alagappan	416243	62/M	RE	stone	I	C	YES	N	N	N	C	VH	V	3\60	6\60	6\18	PPV	nil	Nil	66
81	perumal	413567	39/M	RE	stone	I	C	YES	N	N	N	N	VH	V	6\60	6\36	6\6	PPV	nil	Nil	76
82	suresh	423716	13/M	LE	metal	I	N	YES	N	N	N	N	N	L	1\60	6\6	6\6	forceps	SICS	Nil	66
83	revathy	421353	4/F	LE	metal	I	N	YES	N	N	N	C	VH	V	?	?	?	PPV	nil	Nil	NO
84	ramamoorty	418764	48/M	LE	metal	I	N	YES	N	N	N	N	N	L	2\60	6\9	6\6	forceps	SICS	Nil	66
85	malakondiah	429515	26/M	RE	metal	L	C	YES	EX	NRTL	CPA	C	VH	V	HM	1\60	6\6	PPV	nil	endoph	39
86	babu	426485	27/M	LE	glass	I	N	NO	N	N	N	C	N	V	6\36	6\12	6\6	GM	nil	Nil	76
87	devi	417694	29/F	RE	stone	I	C	YES	N	N	N	N	VH	AC	6\60	6\18	6\6	GM	nil	Nil	76
88	manikandan	418395	43/M	LE	metal	I	C	YES	N	N	N	N	VH	AC	5\60	6\36	6\6	forceps	nil	Nil	66
89	lekshmi	417749	36/F	LE	metal	I	C	YES	N	N	N	N	N	V	6\9	6\6	6\6	forceps	nil	Nil	86
90	dayalan	418873	48/M	LE	veg	L	C	YES	EX	NRTL	CPA	C	VH	V	HM	1\60	6\6	PPV	nil	endoph	39
91	ravi	419366	49/M	LE	veg	I	N	NO	N	N	N	N	N	L	PL	6\12	6\6	forceps	SICS	Nil	56
92	radha	416593	56/M	RE	metal	L	N	YES	EX	sluggish	CPA	C	VH	V	L	HM	6\9	GM	nil	endoph	39
93	suresh	415683	19/M	LE	metal	I	N	YES	N	N	N	N	N	L	HM	6\12	6\6	NO	nil	Nil	56
94	subramani	402732	22/M	LE	metal	L	C	YES	N	N	N	N	VH	V	1\60	HM	6\18	GM	nil	RD	45
95	gangamma	407127	52/F	RE	veg	I	C	NO	N	N	N	N	N	V	6\60	6\36	6\9	PPV	nil	Nil	76
96	logammal	407512	69/F	LE	veg	L	C	YES	N	sluggish	CPA	N	VH	V	PL	HM	6\12	PPV	nil	endoph	39

97	naresh	405438	7/M	LE	metal	I	N	YES	N	N	N	Dis.	VH	V	1\60	5\60	6\6	GM	SICS	Nil	66
98	ravi	407127	27/M	RE	metal	I	N	NO	N	N	N	C	N	L	3\60	6\12	6\6	forceps	SICS	Nil	66
99	kamalan	402796	45/M	LE	veg	I	C	NO	N	N	N	C	N	L	HM	6\12	6\9	forceps	SICS	Nil	56
100	asok	407590	27/M	RE	metal	I	N	YES	yphem	sluggish	CPA	N	N	R	6\9	6\9	6\6	barrage	nil	Nil	86
101	vimalammal	406009	41/F	RE	metal	I	N	NO	N	N	N	Dis.	VH	V	2\60	6\24	6\6	PPV	SFIOL	Nil	66
102	aro.mary	409374	40/F	LE	metal	I	N	NO	N	N	N	N	N	V	5\60	6\24	6\6	GM	nil	Nil	66
103	gokul	409030	11/M	LE	stone	I	C	NO	N	N	N	C	N	L	3\60	6\12	6\6	forceps	SICS	nil	66
104	m. durai	409218	24/M	RE	glass	I	N	NO	N	N	N	C	N	L	HM	6\18	6\6	forceps	nil	Nil	56
105	chellan	401575	63/M	LE	metal	L	C	YES	EX	sluggish	CPA	Dis.	EX	V	1\60	1\60	6\12	PPV	SFIOL	endoph	49
106	ezhumalai	408614	57/M	RE	metal	I	N	YES	N	N	N	N	N	V	3\60	6\36	6\12	GM	nil	Nil	66
107	muthu	412738	30/M	LE	metal	I	C	NO	N	N	N	N	N	V	4\60	6\18	6\9	GM	nil	Nil	66
108	sankar	412738	28/M	LE	metal	I	N	YES	N	N	N	Dis.	N	N	2\60	6\18	6\6	PPV	SFIOL	Nil	66
109	subbammal	413214	48/F	LE	metal	I	N	NO	N	N	N	N	N	V	1\60	5\60	6\9	GM	nil	Nil	66
110	meeran	401137	43/M	LE	veg	I	C	NO	N	N	N	N	N	V	6\36	6\18	6\9	GM	nil	Nil	76
111	gokila	400640	38/F	RE	stone	I	C	NO	N	N	N	N	N	V	6\18	6\9	6\6	forceps	nil	Nil	76
112	rajesh	400941	23/M	RE	metal	I	N	NO	N	N	N	C	N	L	PL	6\6	6\6	forceps	nil	Nil	56
113	chandra	401327	27/F	LE	metal	I	C	NO	N	N	N	N	VH	V	3\60	5\60	6\6	PPV	nil	Nil	66
114	mari	401283	23/M	LE	glass	I	N	YES	N	N	N	C	N	L	PL	6\9	6\6	forceps	SICS	Nil	56
115	maniamma	401528	39/F	RE	veg	I	SCH	YES	N	N	CPA	N	VH	V	5\60	6\36	6\6	PPV	nil	endoph	66
116	muthaiah	401376	28/M	LE	metal	I	N	NO	N	N	N	C	N	V	HM	1\60	6\6	forceps	SICS	Nil	54
117	vasumati	404129	29/F	RE	metal	I	N	NO	N	N	N	N	VH	CV	6\36	6\24	6\9	GM	nil	Nil	76
118	satish	403217	69/M	LE	metal	I	C	YES	EX	sluggish	N	N	VH	AC	6\12	6\9	6\9	PPV	nil	Nil	86
119	chinaponu	403512	62/F	RE	glass	I	N	NO	yphem	N	N	C	N	L	PL	6\9	6\6	forceps	SICS	Nil	56
120	murali	404010	15/M	LE	stone	I	SCH	YES	N	N	N	N	VH	V	4\60	6\36	6\6	PPV	nil	Nil	66
121	jeevita	405767	6/M	LE	veg	I	C	NO	N	N	N	C	N	AC	6\60	6\9	6\6	forceps	SICS	Nil	76
122	pavithra	407329	48/M	LE	metal	I	C	NO	N	RAPD	N	N	N	L	1\60	1\60	6\6	PPV	nil	RD	45
123	rajammal	401537	35/F	LE	metal	I	C	YES	N	N	N	N	N	V	6\9	6\9	6\6	GM	nil	Nil	86

OTS	max ex vn
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1	pl
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